

Reaching Our Goals



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..... P R O G R E S S I N R E A D I N G

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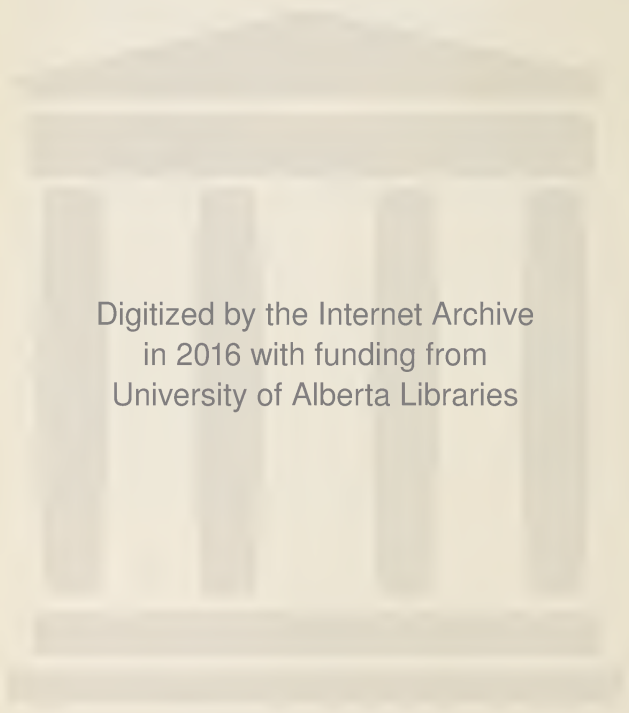
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PREFACE FOR BOYS AND GIRLS

Have you ever stopped to think how many times a day you read? When you get up in the morning, you may read the paper or look in the radio guide to see what programs are on the air. On the way to school, if you live in town, you may read the signs in the store windows. And after you get to school, you use books almost every hour of the day.

There are stories in this book that you will read just for fun. You will find "An Indian Boyhood" most exciting. There are lessons that tell you important facts that you want to know. One lesson tells you the danger in careless uses of gasoline. But whether you read just for fun or to find out something that you need to know, you must be able to read well.

There are four things that you need to know in order to make good use of books:

First, how to find something that you want to read. Sometimes you will want to find information about some question that interests you. At other times you will want to find a good book or a story to read just for fun.

Second, how to understand what you read. You will need to know just what the author means, to decide which things that he tells are important, and to select just the information that you need.

Third, how to organize the facts that you read. Sometimes you will find important facts about a question in more than one book. You must be able to put these facts together to answer your question.

Fourth, how to remember what you read. You must learn to decide what is worth remembering, as well as what to do to remember it.

Reaching Our Goals will help you to learn to do all of these things. Your part will be to practice these skills, not only when you read this book but also when you read other books, both in and out of school.

THE AUTHORS

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The Circus Comes to Town

I. THE CIRCUS GETS READY FOR THE ROAD

Whether boys and girls live in big cities or in small towns or on farms several miles from the nearest village, going to the circus is one of the most exciting events of the year. As you read Part I of this lesson about circus life, try to answer this question:

How do circus people prepare for the summer's performances?

As most of us think of it, a circus merely "comes to town," arriving mysteriously in the gray of morning from some unknown point, setting up its tents, giving its shows, and then departing, as it came, in darkness. Everything moves so smoothly that it seems to work by magic. Perhaps it is this seeming magic that has attracted many people to the circus.

Many boys have counted as one of their great experiences the morning they got up to "see the circus come to town." And no matter whether he is old or young, the watcher, who has arisen at daybreak to see the circus unload, looks for one thing. The show may have promised hundreds of performers. It may have promised five rings and three stages and even a "grand, glittering, and gorgeous street spectacle three miles long"—although this seldom happens nowadays, since traffic problems prevent all but the smaller shows from giving parades. But no matter what the billboards may have promised, the early morning watchers keep their eyes on the big cars which



house the elephants, and they count the huge animals as they come out. If a circus has a great many elephants, it is a big show.

Few people think of the tremendous planning, work, and energy necessary to bring a show into town. When the circus season ends for the people who go to see the show, work is just beginning for those who must keep it running. That is the time when the show goes into winter quarters, which may be any place where conditions suit the owner. One circus winters in Florida; another goes to California.

Winter is a busy season. The performers have scattered. Some have gone to Europe. Others run



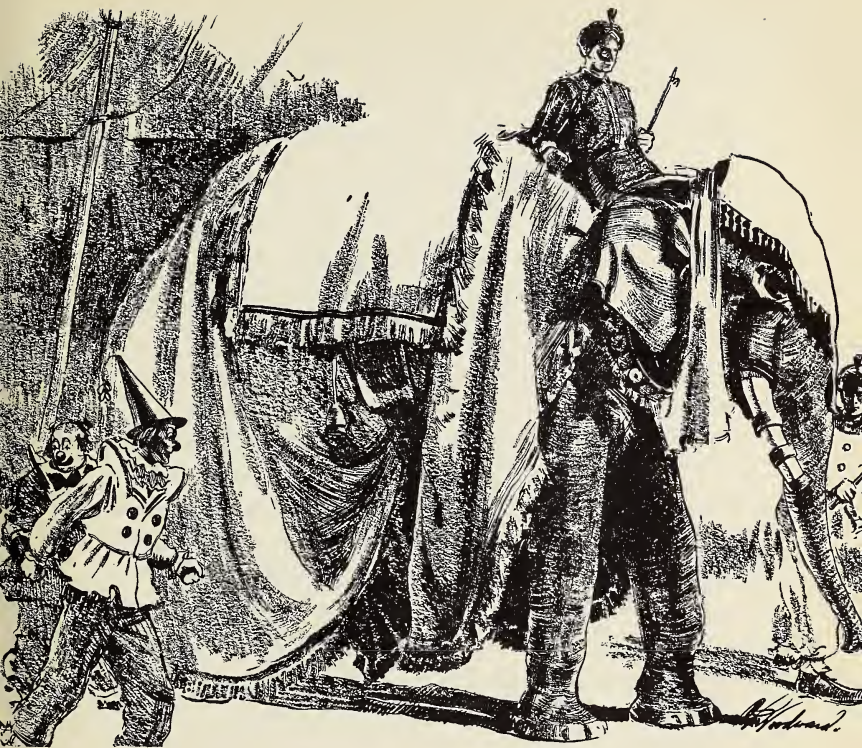
W. B. Gooden

chicken ranches and filling stations. Others perform in traveling shows, or go into motion-picture work. Many clowns add to their earnings by appearing in big department stores at Christmas time. Only the animal-tamers, the horse-trainers, the business managers, and the skilled workmen remain at winter quarters. For them there is much work to do.

The railroad cars which transport the show must be repaired and repainted. Big circuses own all their railroad equipment except the engines. A small show traveling by railroad uses about thirty cars of different kinds; the largest has about a hundred 70-foot cars. Besides the cars, every show wagon must be gone over, every cage repaired, every freight wagon made ready for a season of pounding about the country. Often a circus travels a total of 17,000 miles in one season.

New tents must be made. Sometimes these are purchased from tent companies, and sometimes they are made on the grounds. When one considers that the main tent, or "big top," of a circus covers more than three acres of ground, one can realize the tremendous job of making such a tent. In addition there are the side-show tents, the dressing tents, the horse tents, and the tents for the cookhouse and the blacksmith shops. At least every other season new ones of each kind are needed.

Every tent stake must be repainted and resharpened, every tent pole examined for weak or broken places. All harness must be gone over. Meanwhile, in the animal houses all performing animals must



continue their schooling, so that they will not forget their lessons from one season to the next.

Then there are the costumes. All winter long, in a great building, women are at work making the costumes. There are rhinestones by the bushel and brilliants by the thousand pounds—but none of the tinsel which most persons associate with the circus. Tinsel is for Christmas, not for circuses; it is too easily de-

stroyed. Only materials of the strongest kind—which in this case means the finest—can stand the hard wear of a circus season. Therefore the velvets, the satins, the silks, and all the other materials which you see in a circus performance are the most expensive that can be bought. They are purchased as much for wearing qualities as for show. The beautifully decorated blankets that are worn by the elephants and camels and horses are of extra-thick velvet and may cost hundreds of dollars apiece.

March is a busy month. Not only are the final touches being given to the equipment, but last-minute arrangements are being made by the managers for taking to the road in April. All winter scouts have been touring Europe in search of new acts, for the circus changes from year to year, although the general plan of entertainment remains the same. There is as much excitement in a circus over a new and thrilling act as there is in a family when a new baby arrives.

Now the press agents are writing articles and advertisements for the newspapers. Posters are being printed and stacked in the various advertising cars. Big shows often send three advertising cars ahead of a show, a week apart. These carry posters by the ton and crews of workmen who cover the billboards within miles of the show place. Added to these are the men who buy food for the circus people and the animals, rent the show grounds, get permission to bring the show to town, and attend to half a hundred other matters which must be arranged beforehand. Where, for example, would the elephants get their water if

someone had not made arrangements for it to be supplied from a fire hydrant? With one circus having more than forty elephants, the job of carrying water is too great for small boys of the neighborhood. But, nevertheless, there are other jobs for them.

Every show carries what is known as a "punk boss." He is the man who hires boys, or "punks," as the circus people call them, and has them on hand for work when the show arrives. They help to carry canvas, seat planks, and other materials, and they receive free admission tickets as wages. In addition, many regular workmen travel with the circus to put up the show.

But, first, to get to a town, a show must have a route. Planning this is another part of the March work. A show does not usually make more than a 100-mile journey in a night; therefore, the men who plan the route of the show must be experts in geography. They also pay close attention to business and farm conditions throughout the country, and they have studied the weather for various sections over a period of many years. They know what average of weather to expect; they know whether a community is rich or poor; and they know exactly by which railroads to get into a town and by which to leave.

A show train is sent on a railroad as a "circus special," with its own schedule. Ahead of the train travels the "twenty-four-hour man." He got that name because he is supposed to go ahead of the show by twenty-four hours. He deserves it, too, because he often works day and night. It is his duty to check on everything done by the hundred or more men who

have gone before him ; he must see that food and feed are waiting, that unloading conditions will allow the circus to get to the show grounds as soon as possible.

Every arrangement has been checked, every plan has been carefully made before the "circus special" rolls into town in the gray dawn of circus day.

How Well Did You Read?

How well did you read the lesson about the circus? Without rereading or looking back, answer the following questions. Then turn back to the lesson and see whether or not your answers were correct.

1. How do some people measure the size of a circus?

2. What kinds of work do circus people do during the winter?

3. Do all the circus people work at winter quarters?

4. What kinds of repair work are done during the winter?

5. Why do circus people buy expensive materials for the costumes?

6. Where do scouts sometimes go to look for new acts?

7. How is the circus advertised?

8. How do the circus people make sure that there will be enough food and water for the performers and animals when they arrive at a town?

9. What conditions do the managers consider when they decide which towns shall be on the route of the circus?

Learning What New Words and Phrases Mean

Almost every business has special words or phrases that describe its work and its workers. You probably noticed such words and phrases in the lesson about the circus. A few of them are common to many businesses, and some of them belong just to the circus.

Can you explain the meanings of the words and phrases in the list below? If you have difficulty with any of them, turn back to the lesson to find how they are used there.

winter quarters

the big top

press agent

punk boss

punks

twenty-four-hour man

circus special

scouts

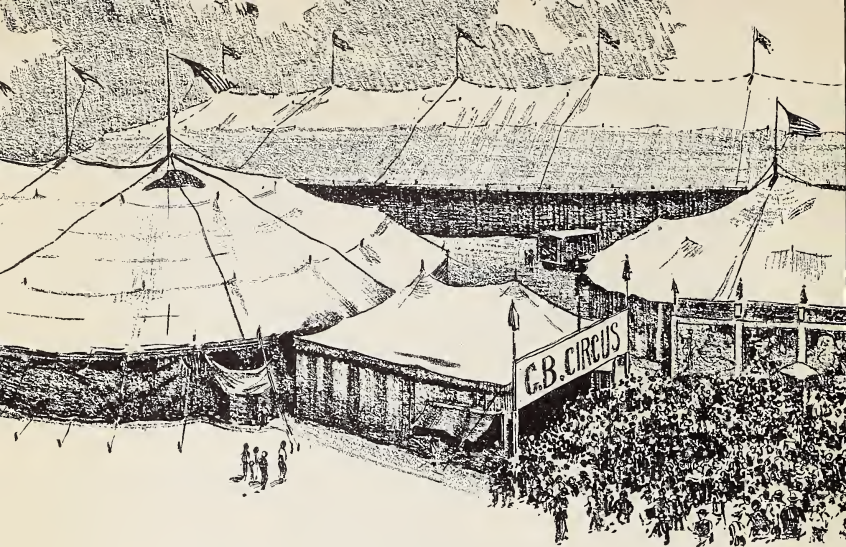
II. AT THE CIRCUS

Part II of "The Circus Comes to Town" tells about things that go on after the circus has reached the town or city where a performance is to be given. As you read Part II, look for answers to these questions:

1. Where do circuses get their animals?
2. How do the elephants help the circus?
3. How is the performance directed?
4. How do the performers live?

Now the circus is in town, and with the circus tents in place, the gates open "twice daily, rain or shine."

Young and old alike crowd the animal tent. The circus has given many people their chief knowledge of animals. It brought the first giraffe, the first hippopotamus, and the first rhinoceros to America.



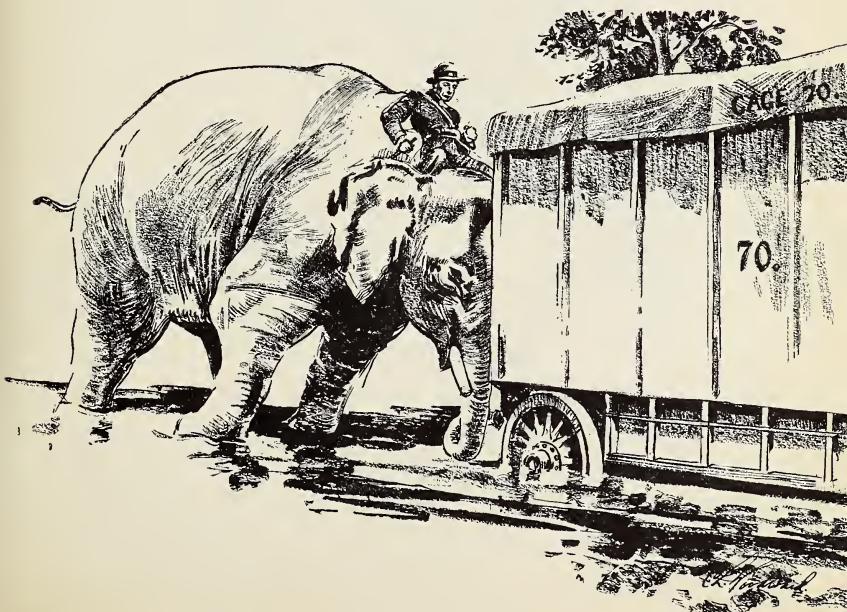
Circuses get their animals in many ways. Captains of tramp steamers stopping at jungle ports often make money on the side by bringing in animals. A group of men in Germany have for years supplied circuses and menageries, as well as zoos, all over the world; and there are many other businessmen who sell animals.

Animals are expensive. A good lion may cost from \$500 to \$1000. Good circus elephants bring from \$3000 to \$10,000, and are worth every cent of it, since the whole circus centers about the elephant.

A weak bridge can be tested quickly and surely by a wise herd queen, or leader, who merely presses one foot on the bridge and knows at once whether it is strong enough to hold up a heavy load. The elephants haul material from the railroad cars to the circus grounds in the morning and haul it back at night.

When a wagon gets stuck in mud and horses fail to budge it, the elephants can push it out with their great heads. In the morning they put the wagons in place on the circus lot. At night they push them out and get them ready for teams to haul to the railroad yards. If a switch engine is not handy, they can move a railroad car. And, of course, they are the center of interest in the menagerie.

Elephants are the only wild animals that stay with a circus because they love it. No ordinary means can hold an elephant which wants to get away. Its great strength can break the ordinary chain like a piece of string. But elephants don't want to leave the circus. They like to be with people, and they like the candy, apples, peanuts, popcorn, and other treats that come to them daily.





But this is an article on the circus, not on elephants. So on we go, into the big tent. A whistle has just sounded. "Tournament," the opening part of the performance, is just beginning. That whistle will sound many times during the show, for a circus runs by the whistle of the director. This whistle always directs the performance, just as the band keeps the time for the circus. A workman on the circus grounds can always tell the hour of day by the music the band is playing. He knows that certain musical numbers are for certain acts, and that certain acts are due at such and such a time. He seldom needs to look at a watch.

If you want to see a circus properly, do not try to watch all the rings and stages, but choose just one place. You will see everything. The purpose of having several rings and stages is not to show a wider variety of acts, but to give everyone in the tent a chance to see well. Some of the big tents are nearly two blocks long; so some of the acts must be of the same kind. Three riding acts and two or three trapeze acts may be going on at one time.

Some people think of the clowns as a leading part of the circus. Strangely enough, however, the clowns are important to the circus largely as a "cover-up." They rush into the main tent and take the attention of the audience from the fact that the rings and stages are being made ready for other acts. Time was when a circus was planned about a chief clown who told jokes and sang. That time is past because of the large size of present-day shows. Today the clowns usually just make us laugh at the fads and fashions of the day.

All performers except the stars do more than one act. They are usually employed under contracts which call for them to be "generally useful," and some appear in as many as seven and eight different acts. A girl, for example, may ride the highly trained horses, and also "dress" the elephant act. To "dress" the act means that she seems to train the elephants, while the real work is done by men working with her. Another girl may be on a flying ladder in one act, in a tumbling number in the next, and on a perch, or tall pole, in another.

The performers dress together in a great tent, divided into halves for men and women. Trunks are set in long lines, with a clothes hanger and a pail of water before each trunk. The performers sleep in specially built railroad cars, going to hotels only when the show rests on Sundays. They eat in a great tent known as the cookhouse. Even the stars eat here, and the food is excellent. In the biggest shows, more than six thousand meals a day are served.

The stars may have their own private tents or they may have dressing rooms fitted up in wagons. On trains they have special rooms with many comforts. One famous star had train quarters large enough for a baby grand piano.

Every big show carries its doctor and nurse, and at least one has a hospital car with equipment for performing operations.

Many popular notions about the circus are not true. It never "splits up," one part going to one town and the rest to another. Circus people do not kidnap boys

and girls; it is harder for a child to join a circus than to become president of a bank. It does not carry thieves and rascals, but has its own police department to watch out for bad characters. And it does not leave town as soon as the night performance is over, but starts away from town before the evening show is well begun!

The big show, in fact, begins to leave before dark, moving along a path marked by torches to the place where the cars are loaded. First the cookhouse is packed, as soon as dinner is over; dinner begins at 4.30 P.M. Then the horse tents are packed. As soon as performers finish with their equipment, it is loaded and sent away. By the time the opening tournament starts around the track of the big show, the menagerie tent is being lowered; and long before, the cages have been started on their way. The elephants are the last menagerie animals to leave the grounds, departing as soon as their act in the "big top" is finished. By the time the big show is over, one complete train, known as the Flying Squadron, already has been loaded and often is on the way to the next town at which the circus will appear.

And that is why the circus seems to appear and depart so magically. It knows the meaning of every letter in the word *efficiency*. In addition to that, circus people understand the value of co-operation more clearly than any group you could think of, and they follow the rules of give and take and of the helping hand.

From *Compton's Pictured Encyclopedia*

Selecting Information about Main Topics

Part II of "The Circus Comes to Town" tells many interesting things about the circus and the performers. One good way to make sure that you understand and will remember these interesting things is to select the information that tells about the main topics. Give one or two statements about each of the topics below. If you cannot recall the information you need, reread the part of the lesson that gives it.

1. *The Circus Animals*
2. *The Work of the Elephants*
3. *What Goes On in Circus Rings*
4. *The Clowns*
5. *The Variety of Acts of One Performer*
6. *Feeding the Performers*
7. *Special Comforts for the Stars*
8. *Wrong Ideas about Circuses*
9. *The Efficiency of the Circus*
10. *Rules the Circus People Follow*

Finding New Words and Phrases

Reading about new subjects is one good way to build a larger vocabulary. You learned several new words and phrases in Part I. Now glance quickly through Part II and select several other words or phrases that describe the circus and circus life. Be ready to explain what you think each means. One that you might select is *tournament*. Another is *efficiency*. What others can you find?

An Indian Boyhood

Frank B. Linderman was born in Ohio and went to Montana to live when he was sixteen years old. His early years there were spent as a trapper, hunter, and cowboy. For more than forty years he made his home in a cabin in the woods. He became a close friend of the Crows and other Indian tribes of that section. Mr. Linderman learned the Indian sign language, and because of this, the Indians called him Sign-talker. In this story he has recorded the boyhood experiences of Plenty-coups (plě'n'ti kooz'), a famous Indian chief.

I. PLENTY-COUPS BEGINS HIS STORY

Plenty-coups has been chief of the Crows ever since I knew anything about them. He is probably the only real chief living who has seen much of the life of the Plains Indian, and I have written his story so that a genuine record of his life might be preserved.

Plenty-coups, aided by two of his friends, seated himself in the shade of the tall cottonwood trees that surround his cabin on Arrow Creek.

"I am glad you have come, Sign-talker," he said, his nearly sightless eyes turned upon me. "Many men, both of my people and yours, have asked me to tell you the story of my life. This I have promised to do, and so I have sent for you. But why do you wish to write down my words, Sign-talker?"

The least suspicion that his story might count against him or his people would result in my failure

to get a truthful tale of early Indian life on the plains. My answer must be honestly and carefully made.

"Because I do not believe there is any written story of an Indian chief's life," I said. "If you tell me what I wish to know, and I write it down, my people will better understand your people. The stories which I have written of the Crows have helped white children to know the children of your tribe. Your story will help the men of my race to understand the men of your race."

Magpies jabbered above the racks of red meat hung to cure in the dry air, and the chief's dogs, jealous and noisy, raced below.

"You are my friend, Sign-talker. I know your heart is good. I will tell you what you wish to know, and you may write it down," said Plenty-coups, at last. "I would have Coyote-runs and Plain-bull sit with us each day," he added. "I am an old man, and they will help me to remember."

"Good!" I agreed, glad of their company. They had known Plenty-coups all their lives. Both were old men and were glad that the chief had decided to tell me his story.

"If you do not tell all—if you forget—I will touch your moccasin with mine," Coyote-runs warned the old chief seriously. "We trust Sign-talker," he said. "Begin at the beginning."

"He's more than eighty," I thought, as I looked at the chief's fine face. The broad-brimmed hat, with its fluttering eagle feather, hid the shape of his head. His gray hair fell in braids upon his broad shoulders.



He had been a powerful man, not over-tall, and was now bent a little by the years. His deep chest and long arms told me that when he was younger Plenty-coups had known few physical equals among his people.

He removed the hat from his head, laid it upon the grass beside him, and gripping the arms of the chair to steady himself, stood up. We all rose. His fine head lifted, he turned as though his eyes could see the land he so much loved.

"On this beautiful day, with its flowers, its sunshine, and green grass, a man in his right mind should speak straight to his friends. I will begin at the beginning," he said, and he sat down.

"Where were you born?" I asked, while meadow larks sang in the hayfield.

"I was born eighty snows ago this summer at the place we call The-cliff-that-has-no-pass," said Plenty-coups slowly. "It is not far from the present city of Billings, Montana."

"What are your earliest memories?" I asked, feeling that I had interrupted him.

He smiled, his pipe ready to light. "Play," he said happily. "All boys are much alike. Their hearts are young, and they let them sing. We moved camp very often, and this to me, and the other boys of my age, was great fun. As soon as the crier rode through the village telling the people to get ready to travel, I would find my young friends and we would catch up our horses as fast as the herders brought them in to camp.

"Lodges would come down quickly, horses would be packed, travois loaded, and then away we would go to some new place we boys had never seen before. The long line of pack horses and travois reaching farther than we could see, the dogs and bands of loose horses, all sweeping across the rolling plains or up a mountain trail, made our hearts sing with joy.

"But even in all this we were not completely happy, because we were obliged to travel with the women and the loaded travois. Young men, riding high-spirited horses whose hoofs scarcely touched the ground, would dash past us and race out of sight. Then our mothers would talk together, but so that we might hear.

" 'That young man on the white horse is Little-wolf, son of Medicine-woman,' one would say admiringly. 'He is brave, and so handsome!'

" 'Yes, and he has already counted coup,' another would boast.

" 'Think of it!' another mother would exclaim. 'He has seen but twenty snows! Ah-mmmmm!' Perhaps she would lay her hand over her mouth, which is the sign for astonishment.

"This talking between our mothers made us wish we were men. It was always going on, and we were ever listening. On the march, in the village, everywhere, there was praise in our ears for skill and daring.

"Our mothers talked before us of the deeds of other women's sons, and warriors told stories of the bravery of other warriors until a listening boy would gladly die to have his name spoken by the chiefs in council, or even by the women in their lodges."





How Well Do You Understand What You Read?

This exercise is a test of your ability to get exact meaning from what you read. Five sentences from the story are given below. They are numbered from 1 to 5. Under each of these sentences are two statements, *a* and *b*. For each numbered sentence, tell whether statement *a* or statement *b* gives the better meaning for the sentence. Number your paper from 1 to 5. After each number write the letter that belongs there.

1. The long line of pack horses and travois reaching farther than we could see, the dogs and bands of loose horses, all sweeping across the rolling plains or up a mountain trail, made our hearts sing with joy.

- a.* The excitement of racing the dogs and bands of loose horses across the rolling plains made the boys' hearts sing with joy.
- b.* The whole scene upon which the boys looked made their hearts sing with joy.

2. On this beautiful day, with its flowers, its sunshine, and green grass, a man in his right mind should speak straight to his friends.

- a.* On such a beautiful day a man should tell a story to his friends.
- b.* The beauty of the day should make a man want to tell the truth to his friends.

3. All boys are much alike. Their hearts are young, and they let them sing.

- a.* All boys like to sing when their hearts are happy.
- b.* All boys are happy when they are young.

4. He is probably the only real chief living who has seen much of the life of the Plains Indian, and I have written his story so that a genuine record of his life might be preserved.

a. Mr. Linderman wanted to keep a record of the important events in the life of a real Indian chief.

b. Mr. Linderman wanted to keep a record of early Indian life on the plains.

5. His deep chest and long arms told me that when he was younger Plenty-coups had known few physical equals among his people.

a. Plenty-coups' appearance showed that few of his people had been stronger than he.

b. Plenty-coups had not been acquainted with many strong people.

II. AN INDIAN BOY'S TRAINING

"Your first lessons were with the bow and arrow?" I asked Plenty-coups, to give him another start on his boyhood.

"Oh, no! Our first task was learning to run," he replied, his face lighting up again. "How well I remember my first lesson, and how proud I felt because my grandfather noticed me!

"The day was in summer, the world green and very beautiful. I was playing with some other boys when my grandfather stopped to watch. 'Take off your shirt and leggings,' he said to me.

"I tore them off my back and legs, and stood before him.

“ ‘Now catch me that yellow butterfly,’ he ordered.
‘Be quick!’

“Away I went after the yellow butterfly. How fast these creatures are, and how cunning! In and out among the trees and bushes, across streams, over grassy places, now low near the ground, then just above my head, the dodging butterfly led me far before I caught and held it in my hand. Panting, but hiding my shortness of breath as best I could, I offered it to Grandfather, who whispered as though he told me a secret, ‘Rub its wings over your heart, my son, and ask the butterflies to lend you their grace and swiftness.’



" 'O Butterflies, lend me your grace and swiftness!' I repeated, rubbing the broken wings over my pounding heart. If this would give me grace and speed I should catch many butterflies, I knew. But instead of keeping the secret, I told my friends, as my grandfather knew I would." Plenty-coups chuckled. "And how many, many butterflies we boys caught after that to rub over our hearts.

"We chased butterflies to give us endurance in running, always rubbing our breasts with their wings, asking the butterflies to give us some of their power. We worked very hard at this, because running is necessary both in hunting and in war. I was never the swiftest among my friends, but not many could run farther than I."

"Is running a greater accomplishment than swimming?" I asked.

"Yes," he answered, "but swimming is more fun. In all seasons of the year most of our men were in the rivers before sunrise. Here boys had plenty of teachers. Sometimes they were hard on us, too. They would often send us into the water to swim among cakes of floating ice, and the ice taught us to take care of our bodies. Cold toughens a man. The buffalo runners, in winter, rubbed their hands with sand and snow to prevent their fingers from stiffening in using the bow and arrow.

"Perhaps we would all be in our fathers' lodges by the fire when some teacher would call, 'Follow me and do as I do!' Then we would run outside to follow him to the bank of the river. On the very edge he would

turn a flip-flop into the water. Every boy who failed at the flip-flop was thrown in and ducked. The flip-flop was difficult for me. I was ducked many times before I learned it.

"We were eager to learn from both the men and the beasts who did anything especially well, and so we never got through learning. But swimming was most fun, and therefore we worked harder at this than at other tasks. Whenever a boy's father caught a beaver, the boy got the tail and brought it to us. We would take turns slapping our joints and muscles with the beaver's tail until they burned under our blows. 'Teach us your power in the water, O Beaver!' we said, making our skins smart with the tail.

"I remember the day my father gave me a bow and four arrows. The bow was light and small, and the arrows blunt and short. But my pride in owning them was great, since in spite of its smallness the bow was like my father's. It was made of cedar and was neatly backed with sinew to make it strong.

"Each boy knew his own arrows, and those of the other boys as well. Even the men of the tribe knew each other's arrows by their marks."

"How old were you when you were given a real bow?" I asked.

"Seven," he answered. "When I was seven, my arrows had good iron points which my father got from the white trader on Elk River."

"But your bow was not strong when you were seven years old," I said.

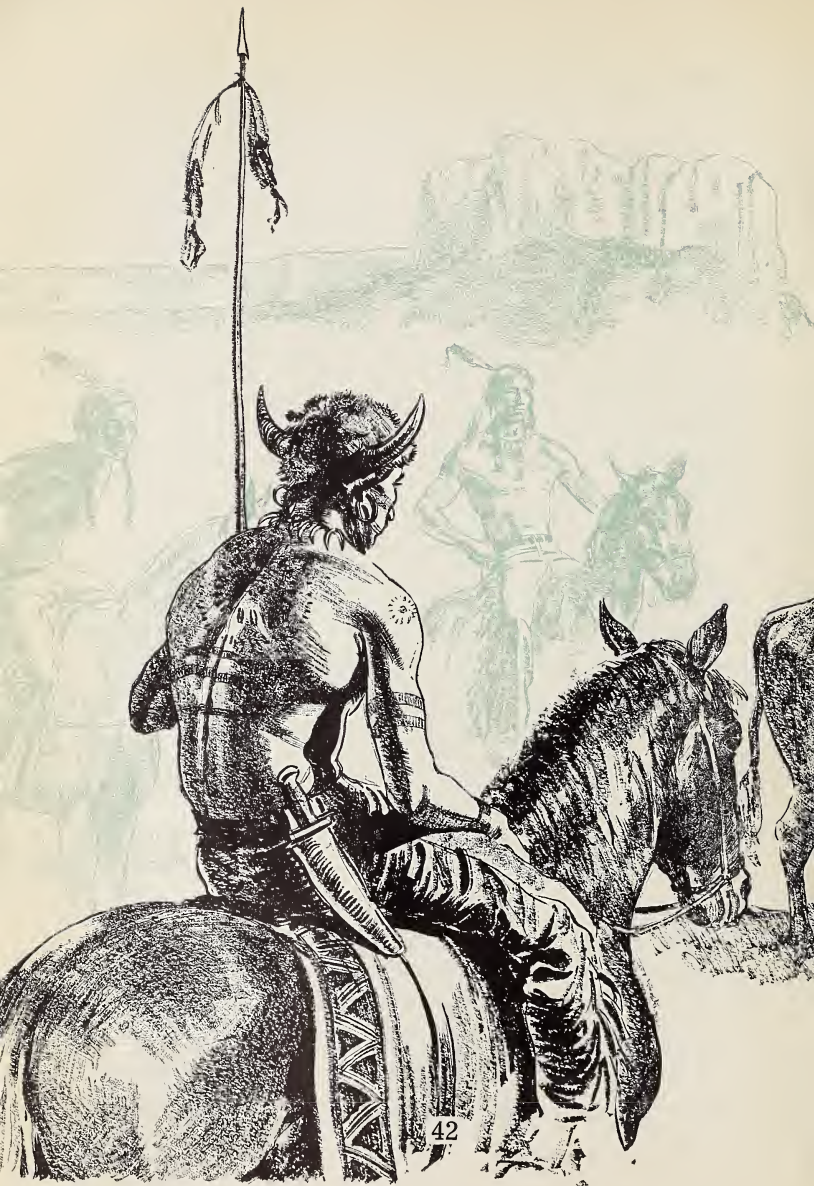
"No, of course not," he laughed. "But I thought it

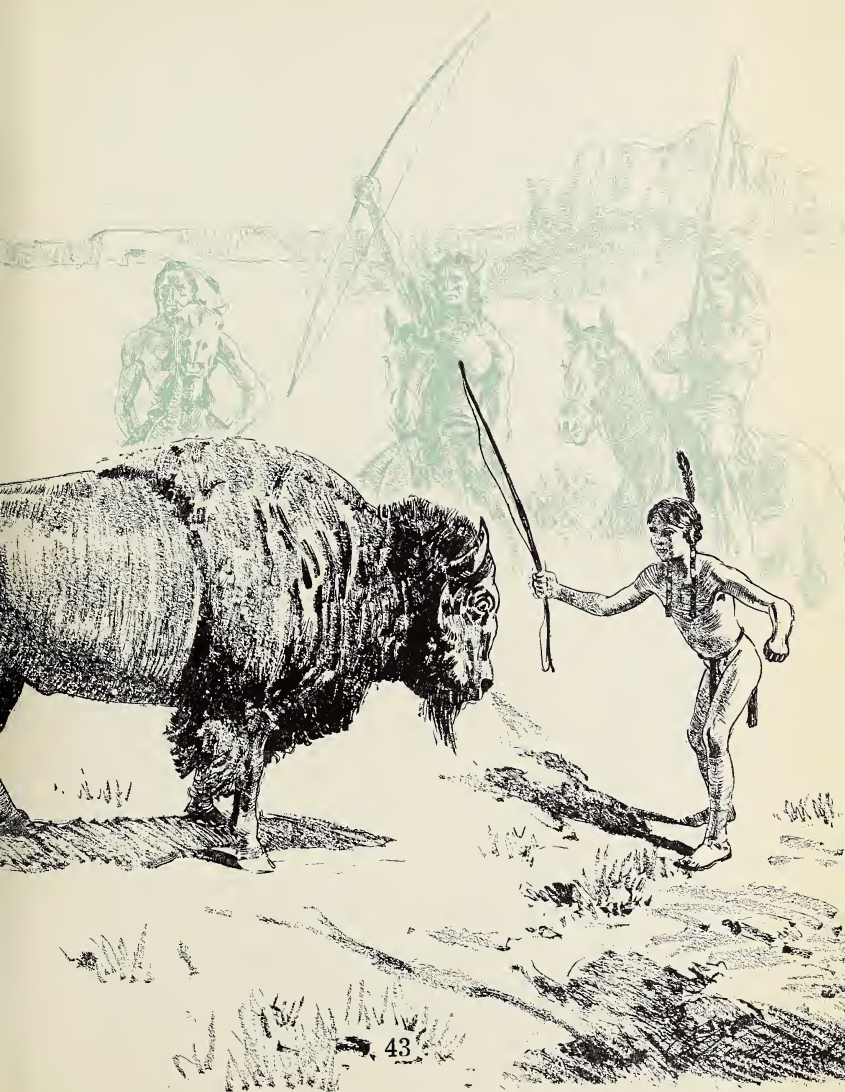
was strong. It was much stronger than my first one, and we hunted deer and antelope on the plains. But our teachers were still our masters, and each day we had work to do.

"We never knew when we might be called by our teachers. Perhaps the morning would be cold and stormy, and we would all be sitting by our fathers' fires when some teacher would cry, 'All Magpies come out!' And out we would come to follow wherever he led. He might lead us to the river where ice cakes floated thickly. And he might toss a handful of peeled sticks into the water, calling out, 'Go get them, Magpies!' Boys were called magpies, meaning that they were 'the mischievous ones.'

"While we stripped off our shirts and leggings, our teacher would tell us that the boy who brought him the most sticks from the water might count coup, which means to get credit in the tribe for an act of honor. There was no waiting, no shirking. In we plunged among the floating ice cakes. The more difficulties we faced, the better for us, since they forced us to use our heads as well as our muscles. Nothing was overlooked that might lead us to self-reliance or give us courage in the face of sudden danger.

"One morning after I was eight years old, we were called together by my grandfather. He had killed a grizzly bear the day before, and when we gathered near him I saw that he held the grizzly's heart in his hand. We all knew what was expected of us, since every Crow warrior has eaten some of the heart of a grizzly bear, so that he may truthfully say, 'I have the heart of a





grizzly!' I say this, even to this day, when there is trouble to face. The words help me to keep my head. They clear my mind, make me suddenly calm.

"One day when the chokecherries were black and the plums red on the trees, my grandfather rode through the village calling twenty of us older boys by name. The buffalo runners had been out since day-break, and we guessed what was before us. 'Get on your horses and follow me,' said my grandfather.

"We rode fast. Nothing was in sight until Grandfather led us over a hill. There we saw a circle of horsemen about one hundred yards across, and in its center a huge buffalo bull. We knew he had been wounded and that he was very dangerous, and when we saw him there facing the men on horseback we began to dread what was at hand.

"The circle parted as we rode through it, and the bull, angered by the stir we made, charged and sent us flying. The men were laughing at us when we returned, and this made me feel very small. They had again surrounded the bull, and I now saw an arrow sticking deep in his side. 'Get down from your horses, young men,' said my grandfather. 'A cool head, with quick feet, may strike this bull on the root of his tail with a bow. Be lively, and take care of yourselves. The young man who strikes, and is himself not hurt, may count coup.'

"I was the first off my horse. Watching the bull, I slipped out of shirt and leggings, letting them fall where I stood. With only my bow in my right hand, I stepped away from my clothes, feeling that I might never see them again. I was not quite nine years old.

"The bull saw me, a human being afoot! He seemed to know that now he might kill, and he began to paw the ground and bellow as I walked carefully toward him.

"Suddenly he stopped pawing, and his voice was still. He came to meet me, his eyes green with anger.

"I stopped walking and stood still. This seemed to puzzle the bull, and he stopped in his tracks. We looked at each other, the sun hot on my naked back. Heat from the plains danced on the bull's horns and head.

"I knew that the men were watching me. I could feel their eyes on my back. I must go on. One step, two steps. The grass was soft and thick under my feet. Three steps. 'I am a Crow. I have the heart of a grizzly bear,' I said to myself. Three more steps. And then he charged!

"A cheer went up out of a cloud of dust. I had struck the bull on his tail. But I was in even greater danger than before.

"Two other boys were after the bull now, but in spite of them he turned and came at me. To run was foolish. I stood still, waiting. The bull stopped very near me and bellowed. The other boys, seeing my danger, did not move. The bull was not more than four bows' lengths from me, and I could feel my heart beating like a war drum.

"Two large gray wolves crossed the circle just behind him, but the bull did not notice them, did not move an eye. He saw only me, and I was growing tired from the strain of watching him. I must get relief, must make him come on. I stepped to my right. Instantly



he charged, but I dodged back to my left, across his way, and I struck him when he passed. This time I ran among the horsemen. I had had enough."

At this ending Coyote-runs spoke up. "I saw him do that," he said proudly. "I was younger than he, but I was there and saw Plenty-coups strike the bull twice. No other boy struck him at all."

Frank B. Linderman

How Well Do You Understand What You Read?

This exercise is like the one at the end of Part I. If you have forgotten the directions, turn back to the exercise following Part I and read them again.

1. "But instead of keeping the secret, I told my friends, as my grandfather knew I would." Plenty-coups chuckled. "And how many, many butterflies we boys caught after that to rub over our hearts."

a. Plenty-coups' grandfather whispered the secret to the boy because he wished him to tell his friends.

b. Plenty-coups' grandfather whispered the secret to his grandson and was disappointed when the boy told the secret to his friends.

2. With only my bow in my right hand, I stepped away from my clothes, feeling that I might never see them again.

a. Plenty-coups thought that someone might take his clothes while he was not looking.

b. Plenty-coups felt that he might lose his life trying to strike the buffalo.

3. The more difficulties we faced, the better for us, since they forced us to use our heads as well as our muscles.

a. Many difficulties were good for the Indian boys, because these difficulties made them think as well as act.

b. In some difficulties the Indian boys struck with their heads as well as their arms and legs.

4. "I saw him do that," Coyote-runs said proudly. "I was younger than he, but I was there and saw Plenty-coups strike the bull twice. No other boy struck him at all."

- a. Coyote-runs was proud because he had seen his friend Plenty-coups perform a brave deed.
- b. Coyote-runs was proud because his friend Plenty-coups was the only boy who had been allowed to strike the bull.

5. "'I have the heart of a grizzly!' I say this, even to this day, when there is trouble to face," said Plenty-coups.

- a. Plenty-coups meant that eating the heart of the grizzly had given him great physical strength.
- b. Plenty-coups meant that the words "I have the heart of a grizzly" gave him courage.

Can You Select Interesting Sentences?

I was born eighty snows ago this summer at the place we call The-cliff-that-has-no-pass.

This is one of the many interesting sentences used by Plenty-coups in telling his story. What words or phrases in the sentence are unusual? Find four other interesting sentences in the story and be ready to explain their meaning to the class. At least one of these sentences should show that an Indian is talking.

Throughout the story there are sentences which show that Plenty-coups loved the outdoor world. Find several of these sentences and be ready to read them to the class.

What's in a Book?

If someone should ask you what is in your geography book, you would probably say, "Why, geography, of course, and pictures and maps that go with the reading." If someone should ask what is in this reader, you would say, "Stories and other reading lessons, with reading exercises that go with each one."

These stories and exercises are the main part of the reader, the part that we call the contents. But this and every book has other parts too. Here are the names of these parts and what they are for:

A. THE TITLE PAGE

The title page tells the name of the book, the name of the author or authors, the name of the publisher, and where the publishing house has its offices. Sometimes the title page tells what kind of work the authors do. Sometimes it tells who drew the illustrations.

Answer these questions about your reader:

1. What is its full title?
2. What are the names of the authors?
3. Who illustrated the book?
4. Who are the publishers?
5. Where do the publishers have their main offices?

B. THE COPYRIGHT PAGE

The most important fact for you to notice on the copyright page is the date when the book was published. Very often this date need not make any difference to you. But if you are studying about some

subject in which changes come fast, the facts in an old book may no longer be true or up-to-date. For example, think of some differences you might find in the geography textbooks published in 1915 and in those published in 1940.

Are you able to answer these questions about your reader?

1. What is its copyright date?
2. Who copyrighted the book?
3. What words mean that no one can print material from this book without permission?

C. THE TABLE OF CONTENTS

By the time you have reached this grade, you are familiar with the table of contents. What does it tell about the book? How are the titles of stories and lessons arranged in the contents? How does the contents help you?

Answer these questions:

1. On what page does the table of contents of this book begin?
2. On what page does the first selection begin? What is its name? How long is it?

D. THE PREFACE

The preface of school textbooks usually tells why the authors wrote the book and the ways in which they hope it will help boys and girls. Sometimes the preface is intended only for teachers and parents; sometimes it is addressed to the boys and girls who are reading the book.

Answer these questions about your reader:

1. To whom have the authors addressed the preface?
2. What is the purpose of your reader?
3. What four things do you need to know in order to make good use of books?

E. THE INDEX

Books for study always have an index. What does the index tell?

Some indexes have only main topics, but others have subtopics too. Has the index of this reader main topics only, or has it both main topics and subtopics?

The table of contents lists the lessons or chapters in the order in which they come in the book. In what order are topics arranged in an index?

How Well Do You Know the Parts of a Book?

Which part of this book will answer each of these questions?

1. How many authors wrote this book?
2. Will this book teach you how to remember what you read?
3. Is there anything about automobiles in this book?
4. If you wanted to find the total number of acres of national forests in 1935, would it be reasonable to look in this book?
5. What is the name of the article about the circus?

Some books have other parts besides these. Look in your geography, your speller, and several other books for parts that are not described in this lesson.

A Fireman Talks about Rubbish

In this lesson a fireman tells how fires start. Find as many of these ways as you can.

Tell me what you do with your rubbish, and I'll tell you what sort of citizen you are. If you dispose carefully of every bit of your broken furniture, your old newspapers, your oily rags, your worn-out clothing, and all such rubbish, you are a good citizen; but if you do not get rid of them and if you allow them to pile up carelessly, you are not only a bad citizen but a serious danger to your neighbor.

What makes oily rags, old clothing, and other such things catch fire? It may be the heat from the furnace, the spark from a cigarette, a candle dropped by someone, the torch of a plumber; or perhaps these things just catch fire from what is called spontaneous combustion.

Spontaneous combustion is a fire that starts itself. It has been discovered that oily rags, moist hay, and certain other things, if left to themselves, will grow hotter and hotter until they finally burst into flame. A new church was once destroyed in that very way. It had just been finished, and on the afternoon before the day set for the first service, some of the women of the church wiped the woodwork with oily cloths. When they had finished the work and were about to go home, one of the women suggested that the cloths should be saved for use as dusters, and so they were put into a



closet for safekeeping. In the night the church was entirely destroyed by fire. The oily cloths in the closet had caught fire by spontaneous combustion.

Remember that if you do not burn your rubbish it may suddenly start to burn all by itself, and perhaps it may do it in the middle of the night.

Let me describe to you a beautiful home which I know. Its lawns are rolled and clipped, its flower beds are carefully tended, its gravel paths are smooth, it has a rosebush at the door and bright-colored awnings at every window, and yet the house is more dangerous to its neighbors than an enemy airplane dropping bombs. One day I was asked to make an inspection there and this is what I found:

In the cellar and under the porch were the barrels and packing boxes that had been used when the family moved in. In the cellar were also the excelsior that came around the new living-room clock, a few old chairs and tables, a broken-down rocking horse, and several boxes of magazines. In the attic were any number of old straw hats, two or three torn mattresses, a lot of old clothes, two trunks of old letters, and I forget what else. On the second floor I found that the housewife had packed away all her light summer dresses in a closet that had a steam pipe passing through it. In the yard, leaves were piled up in a big mound near the steps of the side door. Dead leaves sometimes take fire from spontaneous combustion, and besides, they may easily catch fire from a match or from a spark.

Do you wonder that every time the gong rings at the fire station I think of this house? I know that if it

should catch fire when there is a strong wind, other houses might catch fire too, and the whole block might burn. Then people would blame the fire department for not doing its work well. It would be a good thing for this careless family to learn that rubbish is one of the twenty most common causes of fires.

Before you criticize the owner of this house too much, ask yourself these questions about your house:

1. *Is there rubbish in my basement?*
2. *Is the basement cluttered up with old pieces of boards or with wastepaper?*
3. *If there is kindling in the basement, is it piled up neatly in a place where it is not likely to catch fire?*
4. *If oiled mops or oiled rags are used in the house, are they kept in metal containers?*
5. *Are the closets neat?*
6. *Is there rubbish in the attic?*
7. *Are there piles of rubbish in the yard?*
8. *Is there rubbish in the garage or in any other building in the yard?*

Always remember that a clean house is not likely to burn unless a dirty house sets fire to it, and by a "dirty" house I mean a house where useless junk of all kinds is kept as if it were of the greatest value.

Also, don't forget that dirt and rubbish often help to spread disease. Rubbish piles make good nests or hiding places for rats and mice, and not only do rats and mice carry disease but their nests are fine places for fires to start. From every point of view rubbish piles are wasteful, dangerous, and ugly.

Locating and Illustrating Information

1. How many ways did you find in which fires start?
2. Pretend that you are an inspector examining houses to find those where serious fires might start. With your notebook in hand, inspect the house described in the lesson you have just read. List all the things you see which a fire inspector would consider dangerous.
3. Some words and expressions in the lesson may have been new to you. Look up each of those listed below to see how it was used in "A Fireman Talks about Rubbish." Then use it in a new sentence of your own.

clipped lawns

excelsior

metal containers

spontaneous combustion

dispose of furniture

awnings at the windows

a plumber's torch

carefully-tended flower

beds

basement cluttered up

4. Sometimes pictures show information better than words can tell it. Can you draw a picture or make a poster which will give the main idea of this lesson in such a way that people will be sure to notice it and understand what it means?

Your picture or poster should have a name that will attract attention. Use one of these, or make up your own. The class may select the best posters and plan to use them in an exhibit.

STOP — LOOK — AND BURN UP YOUR RUBBISH

WHICH WILL YOU HAVE —

A BONFIRE OR A HOMEFIRE?

STEP LIVELY —

AND BURN UP YOUR RUBBISH

BURN YOUR RUBBISH

BEFORE IT BURNS YOU

FIRE



**BURN YOUR RUBBISH
NOT YOUR HOME**

Locating Words in the Dictionary

To locate words rapidly in a dictionary you must understand, first of all, the order in which they are arranged. All the words are listed in the dictionary in alphabetical order. Test your knowledge of the alphabet by arranging each of the following lists in alphabetical order:

1. acorn · pencil · house · lion · kite
2. stamp · check · knife · paper · frown
3. flower · wagon · monkey · lamp · gate

0



So many words begin with each letter that, besides the first letter, you often need to look at the second or third or fourth letter of the word in order to locate it in an alphabetical list. For example, *am* comes before *an*; *among* comes before *amuse*; and *amongst* comes before *amount*. Can you tell why? Now arrange each of these lists:

1. basket · butter · biscuit · berries · bottle
2. party · pace · paint · page · pairs
3. circumspect · circumnavigate · circumference · circumstance

In order to locate words quickly you must also understand what guide words are and be able to use them. Guide words are the two words in heavy black type at the top of each dictionary page. The guide word at the left-hand side of the page is the first word pronounced and defined on the page—the one at the top of the left-hand column. The guide word at the right-hand side of the page is the last word pronounced and defined on the page—the one at the bottom of the right-hand column. On page 60 is given a sample page from a dictionary. Find the guide words on this page.

This is the way to use guide words. Suppose you are looking for the word *dignity*. Of course you turn to the *d*'s first, but you may open your dictionary to the page having the guide words *deck* and *deduct*. Why should you not try to find *dignity* on that page? Then as you turn through the *d*'s you may come to a page with the guide words *discreet* and *dishonor*. Why can

pos'se (pŏs'ē), *n.* In full, **pos'se com'i-ta'tus** (kŏm'i-tā'tūs). A force of men who may be called upon by the sheriff to aid him in his duty, as in pursuing a criminal.

pos-sess' (pŏ-zēs'), *v.* 1. To have and to hold as one's own; to own. 2. To influence or control; as, *possessed* by an evil spirit.

pos-ses'sion (pŏ-zēs'hūn), *n.* 1. The act of possessing or holding as one's own. 2. Something which is held as one's own property; something possessed. 3. The fact of being influenced or controlled by another person, spirit, etc.; as, his *possession* by an evil spirit. 4. Self-control; calmness in the face of difficulty, danger, etc.

pos-ses'sive (pŏ-zēs'iv), *adj.* 1. Showing the desire to possess, own, control, etc. 2. In grammar, indicating or relating to that case of words showing possession.

pos-ses'sive (pŏ-zēs'iv), *n.* In grammar, the case (*possessive case*) in which a word is used to show ownership or possession. Thus, in "Mary's dress," *Mary's* is the *possessive case* of *Mary*; also, a word in this case.

pos-ses'sor (pŏ-zēs'ēr), *n.* A person who occupies, holds, owns, or controls.

pos'si-bil'i-ty (pŏs'ī-bīl'ī-tī), *n.*; *pl.* POSSIBILITIES (-tiz). 1. The fact of being possible. 2. Anything that is possible or may occur.

pos'si-ble (pŏs'ī-b'l), *adj.* 1. Within the limits of one's ability; being something that can be done, brought about, etc. 2. Being something that may or may not occur. 3. Able or fitted to be, to become, etc.; as, a *possible* location. — **pos'si-bly** (pŏs'ī-bli), *adv.*

pos'sum (pŏs'ūm), *n.* Short for OPOSSUM.

post (pŏst), *n.* A piece of timber, metal, etc., fixed upright to serve as a support.

— *v.* 1. To fasten on a post, a wall, etc.; as, to *post* a notice. 2. To publish or announce as if by posting a notice. 3. To forbid people from entering, using, etc., by putting up notices of warning; as, to *post* a trout brook.

post (pŏst), *n.* 1. The place at which a soldier, such as one on sentry duty, is stationed; also, the place where a body of troops is stationed. 2. Any place to which a person is sent, appointed, etc. 3. A trading settlement. — *v.* To place or station at a post.

post (pŏst), *n.* A post office or a box for mail; also, mail; a delivery of mail.

— *v.* 1. To travel with speed; to hasten. 2. To send by post, or mail; to mail.

post'age (pŏs'tij), *n.* The charge fixed by law for carrying a letter, parcel, etc., by post.

post'age stamp. A government stamp to pay postage on articles sent by mail.

post'al (pŏs'tāl), *adj.* Of or having to do with the post office or the handling of mail.

post'al card. A card with a postage stamp printed on it, for sending by mail; also, a post card.

post card, or post'card' (pŏst'kārd'), *n.* Any private card mailable when properly stamped; also, a postal card.

post chaise (pŏst shāz), *n.* A four-wheeled, closed carriage for traveling rapidly.

post'er (pŏs'tēr), *n.* A notice, advertisement, etc., intended to be posted in a public place.

pos-te'ri-or (pŏs-tēr'ī-ēr), *adj.* 1. Later; coming after; rear. 2. Situated behind; hinder.

pos-ter'i-ty (pŏs-tēr'ī-tī), *n.* 1. The race of persons who are descended from one ancestor; descendants; as, the *posterity* of David. 2. All succeeding generations of men; hence, future time; as, literature handed down to *posterity*.

post-grad'u-ate (pŏst-grād'ū-āt), *adj.* Of or relating to studies pursued after one's graduation. — **post-grad'u-ate, n.**

post'haste' (pŏst'hāst'), *adv.* With great speed; hastily; as, to go *posthaste*.

post'hu-mous (pŏs'tū-mūs), *adj.* 1. Born after the death of the father; as, a *posthumous* son. 2. Published after the death of its author; as, a *posthumous* novel. 3. Occurring after one's death. — **post'hu-mous-ly, adv.**

pos-til'ion, pos-til'ion (pŏs-tīl'yūn; pŏs-tīl'yūn), *n.* A rider on the left-hand horse of a pair drawing a coach or post chaise.

post'lude (pŏst'lūd), *n.* In music, a closing piece, as an organ solo closing a service.

post'man (pŏst'mdn), *n.*; *pl.* -MEN. A person who carries letters, etc.; a letter carrier.

post'mark' (pŏst'mārk'), *n.* Any mark officially put on a piece of mail, such as a mark canceling the postage stamp and giving the date, place of sending, etc. — **post'mark', v.**

post'mas'ter (pŏst'mās'tēr), *n.* A person in charge of a post office and the mails.

post me-rid'i-em (pŏst mē-rid'ī-ēm). After noon or midday.

post'mis'tress (pŏst'mīs'trēs), *n.* A woman who has charge of a post office.

post'-mor'tem (pŏst'mŏr'tēm), *adj.* Occurring, made, or done after death. — *n.* A post-mortem examination of a body.

post' office. 1. An office, under the charge of a government official, where mail is received, handled, and sent out. 2. That department of the government in charge of the mail.

post'paid' (pŏst'pād'), *adj.* With the postage paid for; as, the card was sent *postpaid*.

post-pone' (pŏst-pŏn'), *v.* To put off till some later time; to delay; as, the meeting was *postponed*. — **post-pone'ment, n.**

post road (pŏst). A road over which mail is or was carried.

āle, chāotic, cāre, ādd, āccount, ārm, āsk, sofā; ēve, hēre, ēvent, ēnd, silēnt, makēr; ice, ūll, charīty; ōld, ōbey, ōrb, ōdd, ōft, cōnnect; fōod, fōot; out, oil; cūbe, ūnite, ūrn, ūp, circūs, menū; chair; go; sing; then, thin; natūre, verdūre; κ = ch in German ich, ach; bon; yet; zh = z in azure. See also page xii.

The above sample page is from *Webster's Elementary Dictionary—A Dictionary for Boys and Girls*, Copyright, 1935, by G. & C. Merriam Company, Springfield, Mass.

you not find *dignity* on this page? Finally you find a page with the guide words *diet* and *dike*. At last you have come to the right page. Can you tell why?

Practice in Using Guide Words

It is difficult to understand just how guide words help you unless you try to use them. Imagine a dictionary page having these guide words at the top:

raft	rain
------	------

As quickly as you can, select all the words from the following list that you would find on that page.

- | | | |
|---------|-------------|-----------|
| a. rag | e. road | i. raffle |
| b. ring | f. radium | j. rage |
| c. rail | g. railroad | k. ranch |
| d. raid | h. rafter | l. rainy |

The following pairs of guide words appeared on four different dictionary pages.

scorer	scratch
scratcher	scuffle
scull	seal
sealer	second

The first word of each pair is the first word defined and pronounced on the page; the other word is the last word defined and pronounced on that page. Between which pair of guide words would *scorn* come? On which page would *scud* be found?

Copy the four pairs of guide words on your paper in this way:

scorer	scratch	scratcher	scuffle
a,			
scull	seal	sealer	second
		b,	

Below each pair of guide words write the letters of all the words from the following list that would be found on that dictionary page. The letters of the first two words, *scornful* and *seaweed*, have been placed with the correct pair of guide words. *Do not write in this book.*

a. scornful	i. scowl	q. screw
b. seaweed	j. scuttle	r. seasoning
c. screen	k. sculpture	s. seat
d. scrim	l. scramble	t. season
e. seclude	m. script	u. scout
f. scrimp	n. seal	v. search
g. scour	o. scrub	w. scrunch
h. seam	p. scythe	x. scourge

As fast as you can, list words that would be found on each of the pages having the guide words given below. Try to write at least three words for each page.

a. paper—patter	d. merry—mew	g. sled—smooth
b. taste—tease	e. fail—famous	h. height—hen
c. garden—gaze	f. bake—bank	i. lead—learn

How to Keep Mail from Being Lost

Do You Know

That 14,000,000 letters went to the dead-letter office in one recent year?

That \$100,000 in cash was removed from envelopes that were incorrectly addressed?

That 10,700,000 letters were finally destroyed?

That Uncle Sam received \$43,000 from the sale of parcel-post packages that were not claimed?

"A great deal of unnecessary trouble and expense," you say, when you read these figures. "How could people forget to put the address on an envelope, or be so careless as to put on the wrong address?" And, "What is the dead-letter office?"

Every day a steady stream of millions of letters and packages pours into the post offices of our country. Day and night the postal employees work at the huge task of sorting the mail and starting it on the right track toward its destination. First of all the letters are "faced up," that is, arranged with addresses running in the same way so that they can be run through a canceling machine. This machine prints something on the upper right-hand corner of the envelope so that the stamps cannot be used again. Those stamps which are not correctly placed in the upper right-hand corners of envelopes must be canceled by hand.

The next step is sorting the mail to be sent to different places. The postal employees work with lightning speed, deciding instantly where a letter should go—north, south, east, or west. Some workers can sort 35

letters a minute and only once in 10,000 times, on the average, is a mistake made.

This sorting of the mail goes on very rapidly until a poorly addressed letter comes along. Then the postal employee, working at high speed, must stop and spend valuable time looking for some clue as to where it should go. Sometimes it is marked "Try," and is then sent out to a possible destination. Sometimes it is stamped "Address illegible," which means that the address cannot be read; then it is returned to its sender. Sometimes it is turned over to a "hard" reader, who, because of his long practice, knowledge of geography, and good sense, can usually read an ad-



dress that would have no meaning to an ordinary person. He has all sorts of puzzling problems to solve.

Many efforts are made to deliver puzzling mail before it is turned over to a branch of the dead-letter office. Even here the troublesome mail cannot be destroyed until every effort has been made to discover the address of the person for whom the letter was intended, or the name and address of the sender. It is opened and examined very carefully for some clue as to where it should be sent. If the sender has written the destination clearly at the beginning of the letter, the message is put back into its own envelope, then into a large government envelope, and sent on, sometimes several days or even weeks later, to the one for whom it was intended. If the writer has not given the destination, but has given his own address, the letter is returned to him, long after he supposed it had been delivered.

In a recent year, the Post Office Department reported that 14,000,000 letters and 350,000 packages went through the dead-letter office, where postal employees made every effort to discover the person for whom each was intended. Why is it that all these letters and parcels could not be delivered promptly?

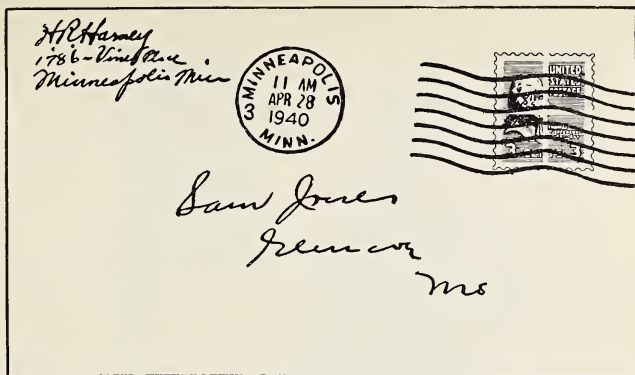
In the first place, of course, most of this mail is mis-sent or delayed because it is not correctly addressed. Sometimes no address at all is given. Many letters containing money orders are mailed in blank envelopes because the sender has written the name and address of the person for whom the money order is intended on the money-order application but has for-

gotten to write it again on the envelope. Special-delivery letters and air-mail letters are often mailed in a hurry. When this happens the sender is likely to make a mistake in the address, often placing his own city, town, or state on the envelope, instead of the one to which the letter should go. The Post Office Department says, "Ask Uncle Sam anything in reason and he will deliver the goods, but don't ask him to guess the address of the person to whom you have written."

Other letters cannot be delivered because they do not carry enough address so that the postal employees can tell where they are to go. The name of the person addressed; the street and number, or the number of the rural route, if the letter is addressed to someone living in the country; and the name of the city and state should always be given in the address. The Post Office Department says, "The man who mails a letter without proper address expects the impossible; Uncle Sam can't tell its destination by fingerprints on the envelope."

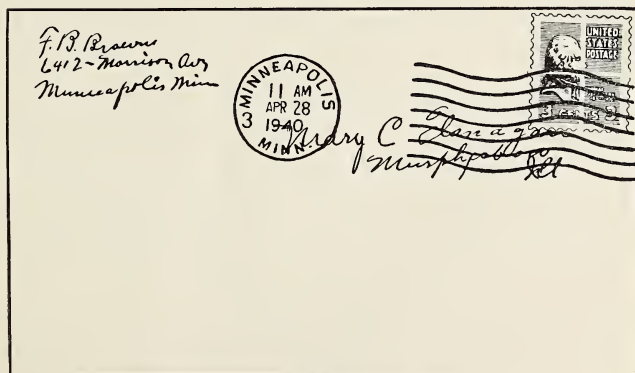
Sometimes a letter cannot be delivered because its address is written poorly. If the writing is very poorly done, either with pencil, or with ink on an envelope of poor quality which blots easily, it is sometimes almost impossible to read the address.

Abbreviations cause a great deal of trouble. These pairs are especially troublesome: Mo. and Md.; Col. and Cal.; Miss. and Minn.; N. J. and N. Y.; Va. and Pa. In fact, abbreviations of states so often cause trouble that the Post Office Department advises people not to use them at all on envelopes or packages, but to write



out the name of the state in full. The illustration at the top of this page shows how easily a mistake may occur because of poorly written abbreviations.

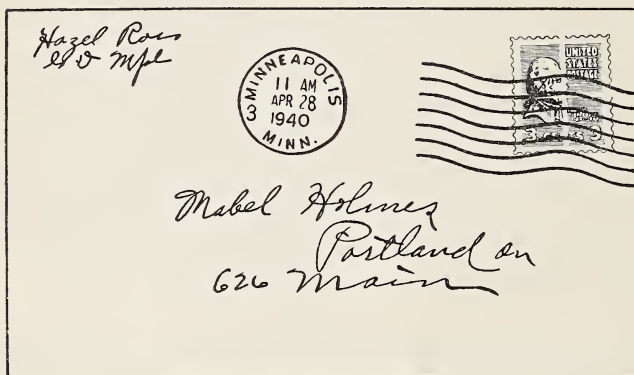
Another thing that makes an address hard to read is wrong spacing on the envelope. If the address is placed too high, the canceling machine may blur it. The letter below shows how this is done.



It is important in addressing envelopes to keep the parts of the address in order. This is the right order:

Miss Helen Woods,	(Name)
346 Pleasant Street,	(Street and number)
Denver,	(City)
Colorado.	(State)

What is wrong with the address in the illustration below? Why might it be sent to Portland, Maine, instead of to Portland, Oregon?



Although wrong addresses cause a large share of the work of the dead-letter office, most of this work could be saved if every piece of mail carried the correct return address of the sender. This form of return address is suggested by the Post Office Department:

After 5 days return to
John C. Smith,
501 Washington Ave.,
Wilkesville, N. Y.



The Post Office Department says: "Every man knows his own address. *Put It in the Upper Left-hand Corner.*" What are the most important items to include in a return address?

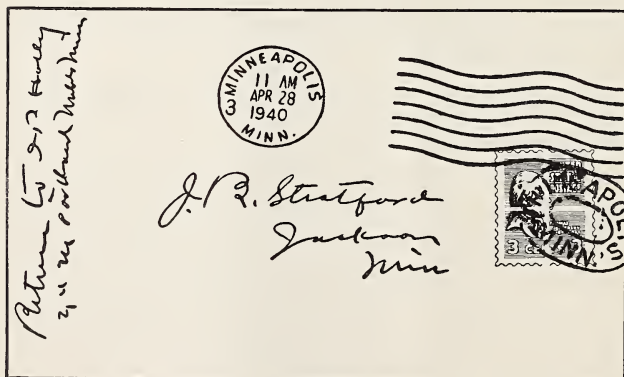
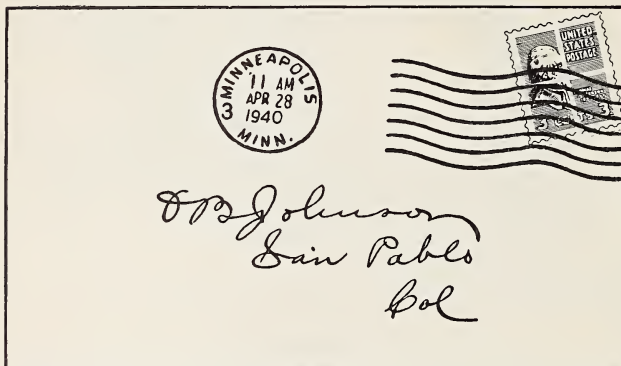
The postmaster in one of our large cities makes the following suggestion:

"Before you mail a letter, stop and look at it. Imagine that you have never heard of the person to whom it is going. Can you make out the name? If you were the postman, could you deliver it? Is there a return address? If you could not deliver the letter, could you return it? If you can answer Yes to these questions, the letter is ready to be mailed."

Memory Test on Important Information

1. Write on a sheet of paper a list of suggestions called "How to Keep Mail from Being Lost." You might start with the two suggestions given below.

- a. Write plainly.
- b. Be sure to put the right address on the envelope.



When you have finished, draw a line below what you have written, and then go back through the lesson to see if you can find more suggestions to add to your list.

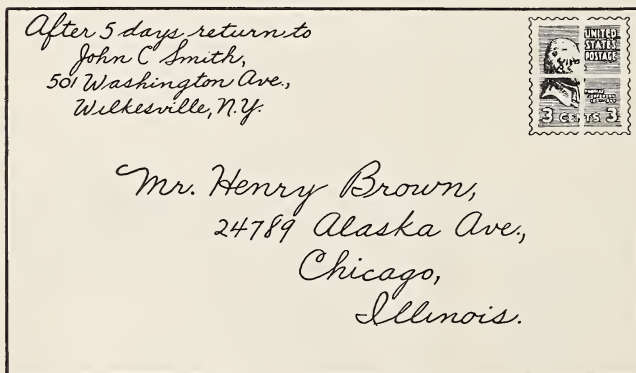
2. What is wrong with the address on each of the four envelopes on pages 70 and 71?



Using Information Secured in Reading

The Post Office Department has given out a form for addressing envelopes which is plain and easy to read. It is the one at the bottom of this page. Some people prefer other forms that are also plain and easy to read. Perhaps your school uses one of these other forms as a model. Using either the model suggested by the Post Office Department or that taught in your school, address envelopes for the following letters:

1. A letter to your teacher from yourself.
2. A letter to Ginn and Company, 15 Ashburton Place, Boston, Massachusetts, from yourself.
3. A letter to yourself written by some friend who lives in another town.
4. A letter to The Nature Magazine, 1214 Sixteenth Street, N. W., Washington, D. C., from yourself.



An envelope correctly addressed

Let the Index Help You

An index is a great timesaver if you know how to use it. These are some of the ways in which the index of a book can help you:

1. *An index gives the main topics that are discussed in the book.* Many indexes also give subpoints or subtopics under the important main topics.

Turn to the Index of this book and quickly find whether these subjects are listed among the main topics:

Cuts	Coal tar	Automobiles
Conservation	Forest ranger	Printing
Trails	Mexico	Dynamite

2. *An index has subtopics that tell what information is given about the main topics.* This helps you to know whether you are likely to find the particular information you are seeking.

Find the main topic *China* and read all the subtopics.

Read all the subtopics under *Stamps*.

Read all those under *Salt*.

Sometimes the index does not give subtopics, but lists just the pages on which something is told about a main topic in this way:

Cochineal dye, 187, 315-316

If you wanted to find out something about *Cochineal dye*, you might have to turn to each page listed before you found what you were looking for. You would probably turn first to pages 315-316 because that is the longer reference. But, of course, you might not

find on these pages just the information for which you were looking. Then you would look at the other page given in the index.

When the index gives subtopics, you need not spend time looking up each reference. You can quickly tell whether the subject you are looking for can be found in the book, and exactly where to find it.

Find the pages on which the following subtopics are discussed. You must first decide under which main topic to look for each one.

Dyewoods	Enemies of birds
Pasteur's early life	Bar graphs
Indian trails	Ancient writing materials

3. *An index gives the number of the page or pages on which a topic or a subtopic is discussed.*

The list of topics and subtopics would not be of much help unless the pages for each topic and subtopic were given. How many pages would you read for each of the following topics?

Dynamite, invention of, 216
Cuts, 351-354
Jungle, 222-240
Birds, 295-301, 394-405

4. *An index has cross references to other topics that give information about the main topic.* For example, in the Index of this book, under the main topic *Counting*, you will find "See Numbers"; under the main topic *Coal tar*, you will find "See also Aniline dyes." Such references as "See Numbers" and "See also Aniline dyes" are called cross references. If you wish to find

out all you can about the topic *Coal tar*, you should look up not only the subtopics given under it, but also the subtopics given under *Aniline dyes*.

Number your paper from 1 to 9. Write the topics given in the Index as cross references for the following topics:

- | | | |
|-----------|-------------------|---------------------|
| 1. Rabies | 4. Block printing | 7. Oral reading |
| 2. Potala | 5. Mesopotamia | 8. Communication |
| 3. Germs | 6. Tenochtitlan | 9. National forests |

How Well Can You Use the Index?

Now number your paper from 1 to 12. Using the Index, find and write down on your paper the number of the page or pages to which you would turn to find answers to these questions:

1. How are forests protected against fire?
2. What people first used movable type?
3. What antiseptic is good to use on a cut?
4. In what countries is salt produced?
5. What is one good form of addressing letters?
6. What kind of flood-relief work is done by the Coast Guard?
7. Where were the early paper mills located in Europe?
8. How were Aztec boys and girls educated?
9. What are some of the products of coal tar?
10. What is the Potala?
11. What laws restricted the development of automobiles in England?
12. What kinds of boats did the Indians of eastern America use?



The Story of Numbers

I. ONE, TWO, THREE, FOUR

In this story you will read about three boys who lived in three different countries many years ago. They could not count as far as you can. Find out how far each could count.

It is so very, very long ago that not even the wisest men of China can tell the year or the century in which little Ching, the king's oldest son, played in the forests

at the foot of Mount Yu, and painted a face on the shell of his biggest turtle, and told the soldier who guarded him what a lot of turtles he had. To be sure, Ching had only three turtles, but he didn't know a word for "three," and the soldier didn't, and even the king himself could do no more than say, "Yes, there are a lot of turtles."

For all this was so long ago that even in the oldest parts of the earth, of which China was one, most people could not count. It was before kings had palaces or crowns or royal robes. So we do not wonder that Ching, even though he was the son of a king, could count only "one, two," everything beyond that being "a lot."

This was as far as people needed to count when Ching was playing in the forest at the foot of Mount Yu, for money was not invented, and we use our numbers today chiefly in buying the things we need. But in those days kings had many slaves and made them work, and sent them to kill animals, and made them bring back skins for clothing and meat for food. Few people needed to count, and only these few ever learned. Even the wisest men did not know much about the numbers that we use every day, because they had no need to do so.

At the time that Ching was growing up in China there lived on the plains of Mesopotamia (mēs'ō pō-tā'mī ā), in southern Asia, a boy named An-am. He was the son of Bel, a shepherd of the country afterwards called the land of Babylon. Bel tended the sheep, and drove away the wolves that prowled about

at night, and kept a careful watch to see that not one of his flock should wander away. An-am was often with his father, helping him guard the sheep.

One day Bel called out to An-am, "There are many sheep out there; drive them back." But really there were only a few sheep, for neither An-am nor Bel could count beyond three, and all larger numbers were called "many."

Nevertheless Bel and An-am knew the sheep so well that they could tell if one was missing, just as a good shepherd dog today knows if one of his flock has gone astray. So An-am and Bel could count "one, two,



three, many," and that was all they needed to know about arithmetic and counting.

While Ching was playing in the forest at the foot of Mount Yu, and An-am was helping to watch the flocks that fed in Mesopotamia, another boy was living on the banks of the Nile in ancient Egypt. This boy's name was Menes (mē'nēz), and he lived not far from the place where now the enormous dam holds back the waters of the great river. The little hut in which Menes lived was the grandest house that he or his father or his mother ever saw, and yet it had only a single room, and this was smaller than the school-room in which you study.

For this was thousands of years ago, long before people had real houses, long before anyone knew how to read or write, long before the world had learned how to weave fine cloth, and long before men knew any other way to make a light than to rub two pieces of wood together until one of them was set on fire. Menes was proud of what he thought was the magnificent house in which he lived, although it was only a little hut, and he was glad to be able to say, "We have a great many palm trees about our house," although there were only six.

Menes had heard his father and mother speak of one tree, of two trees, of three trees, and of four trees, but beyond that they simply said, "a great many trees," for they had names for numbers only up to four, and all beyond that was a great many, just as we might speak of a great many apples. But those numbers were all that Menes needed to know.

How to Organize Information on a Chart

A good way to study some lessons is to arrange the important facts in the form of a chart. Put headings and topics on your paper so that it will look like this:

HOW THREE BOYS COUNTED LONG AGO

<i>What I Learned About</i>	<i>Ching</i>	<i>An-am</i>	<i>Menes</i>
1. His country	-----	-----	-----
2. His father's position . . .	-----	-----	-----
3. What he was counting . .	-----	-----	-----
4. How many things he had .	-----	-----	-----
5. How far he could count . .	-----	-----	-----

Now fill in the chart with the facts given in the lesson. Under the name of each boy, write the information that belongs opposite each topic in the column marked "What I Learned About." What should you write first below "Ching"? Should you write *China*? What should you write next under "Ching"? Should you write *king*? Complete the chart in this way. You may turn back to the lesson to find the right words or phrases. If the story does not give some information that you need, draw a line in the space. *Do not write in this book.*

When your chart is finished, you may read it two ways. If you read down the column about one of the boys, you will quickly see all the information about that boy. If you read the chart from left to right, you

will find one fact about each of the three boys. For example, you will see quickly where each boy lived or what each one was counting.

Memory Test

Think how the boys in the story would have counted the squares shown here:



1. How would Ching have counted them?
2. How would An-am have counted them?
3. How would Menes have counted them?

II. LEARNING LARGER NUMBERS

Hundreds of years after Ching and An-am and Menes lived, people had learned a little more about counting. How far could the boys in this lesson count?

When Ching and An-am and Menes grew to be men, Ching became a king, An-am became a manager of the Babylonian king's estates, and Menes became a great captain in the wars against the savages who lived in the south. Even though they were important men, Ching could count only to two, and An-am to three, and Menes to four, because this was as far as people in their countries could count in those days. Money was still unknown in the world, and no one measured

land or buildings or the things which they traded with one another.

But many hundreds of years later other boys played in the forest at the foot of Mount Yu, and they counted "one, two, two and one, two twos, two twos and one, a lot." The world was growing, and people needed larger numbers, and so they counted as far as "two twos and one," which we call "five," and all beyond that was simply called "a lot."



And other boys helped to tend the flocks of Babylon, and their fathers taught them to count by threes: "one, two, three, three and one, three and two, two threes, two threes and one, two threes and two, three threes, three threes and one, three threes and two, many." They did not know a word for four, so they could not say "four threes," and they just said "many." Of course they said a different word, using the language of ancient Babylon. The world of Mesopotamia was growing older, and people needed more number names; but they still had no money, and a few such names were quite enough.



While the boys were counting to "two twos and one" in China and to "three threes and two" in Mesopotamia, Egyptian boys played under the palms where long before their time Menes had looked with pride upon his father's hut. No longer, however, was there just a hut with a single room, for the world was growing still older, and the great-great-grandchildren of the Menes of long ago had now a house with two rooms and the Menes of this time had learned a new way of counting.

The people along the Nile had found that the fingers of one hand would help them with their numbers, and so they made new names as far as five. Now Menes counted "one, two, three, four, five, five and one, five and two," and so on to "five fives and four"; and then he gave up and said "a great many." He could count farther than the Chings and the An-ams, but "five fives and four" is only twenty-nine, and this does not seem very far to us. But this was long before people could read and write, when they used knives made of stone, and when they thought the world was growing old, while to us it seems to have been very young.

Understanding What You Read

Answer as briefly as you can these questions about the ways of counting that were used hundreds of years after Ching, An-am, and Menes lived:

1. What was the highest number name used by the people in China?
2. How high could the people of China count?

3. What were all numbers above that called?
4. How would the people of China have counted to three?
5. What was the highest number name used by the people of Babylon?
6. How high could the people who lived in Babylon count?
7. What were all numbers above that called?
8. How would the people of Babylon have counted to ten?
9. How would they have counted to seven?
10. What had the people of Egypt learned to make use of in counting?
11. What was their highest number name?
12. How high could they count?
13. What were all numbers above that called?
14. How would the people of Egypt have counted to fourteen?
15. How would they have counted to twenty-five?
16. Had the people of these times learned to read and write?

Another Memory Test

On your paper write the names of the three countries, China, Babylon, and Egypt, in a column. Hundreds of years after the time of Ching, An-am, and Menes, what would the children in China, Babylon, and Egypt have called this number of circles?

○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

Write your answer after the name of each country.



III. FINGERS AND TOES HELP

By what three different numbers did the people in this story count?

Hundreds of years again went by, and still new Chings and An-ams and Meneses played in the forests of Yu, or on the plains of Mesopotamia, or on the banks of the Nile. Now the world began to feel that "five fives and four" was not large enough, even in ancient Egypt. Then it was that someone thought that, if people could count to five on one hand, they might as well count to ten on two hands. So the Ching and An-am

and Menes of that day counted the trees and sheep by learning number names to ten. Then they said "one and ten, two and ten, three and ten," and so on to "ten tens, ten tens and one," and as much farther as they wished to go.

The world had discovered that its ten fingers were useful in counting; and this was one of the greatest discoveries the world ever made. Although boys and girls speak different languages, they all have ten fingers, and so all civilized people today count by tens.

Near the equator, where the climate is hot and where people did not wear shoes, they counted their toes as well as their fingers, learning separate number names to twenty,—not "one and ten," "two and ten," and "three-ten" (thir-teen), but "eleven," "twelve," and so on, with special names, to twenty, which they sometimes called "man finished," and beyond that they counted by twenties.

Some of these people wandered to other countries and carried along with them their way of counting. But most of the people of the world did as the children of Ching and An-am and Menes did; they counted by tens. When we hear of "three score years and ten," and when the French speak of "four twenties" instead of eighty, we have two remaining bits of the old way of counting by twenties.

Thus the world learned from Ching and An-am and Menes, and from their children and their children's children, and so on for hundreds and hundreds of years, first to count by twos or threes, and then by fives, and then by tens, and sometimes by twenties. A

few people tried to count by twelves, and so we have twelve inches in a foot, twelve ounces in the ancient pound, and twelve things in a dozen, but the reason why the world came to count by tens was because Ching and An-am and Menes and you and I have just ten fingers on our two hands.

Long after the early days of which we have been speaking, the world learned how to write numbers. Because different races wrote them in different ways, the merchants who traded with others whose language they did not speak represented numbers by their fingers. For at least two thousand years the merchants of different countries made number signs with their fingers in bargaining at the great fairs where they met to buy and sell the goods that thus went from country to country,—spices from India, silks from the land of Ching, wool from the ancient home of An-am, and dates from the palm trees under which Menes played many centuries before.

David Eugene Smith

A Summary Test about the Story of Numbers

The story of how we got our numbers tells many interesting things about the life of the people who lived long ago. As quickly as you can, give the answers to the following questions. You may need to turn back to the article to find the information or to make sure that your answers are correct.

1. Which of the following things are true about the people who lived when Ching played with his turtles?

- a. Kings lived in palaces
- b. Kings had slaves to work for them
- c. Money was used for buying articles
- d. Animals supplied people with many of their common needs

2. At the time when the first Menes lived, which of the following things did the people know how to do?

- a. Build huts to live in
- b. Read and write
- c. Weave fine cloth
- d. Make a light by rubbing pieces of wood together

3. What points can you give about each of the following topics? As you give each point, tell whether it is about China, or Babylon, or Egypt.

- a. What the people of long ago did for a living
- b. How the countries in the story were ruled
- c. What the children liked to do
- d. How people obtained the things they needed

4. What number do people use to count by in civilized countries today?

5. Why is ten a good number to count by in all parts of the world?

6. What difference did the climate of the hot countries make in the way of counting?

7. What phrases do we sometimes hear to remind us that some people once counted by twenties?

8. How are we reminded that people once counted by twelves?

9. Which of these numbers have been used to count by?

2 3 4 5 6 8 10 12 14 16 18 20 25

Paragraph Headings

By this time you probably have learned several things about paragraphs from your reading and also from your composition work. You know that the first line of a new paragraph is indented, or set a little farther from the edge of the page than the other lines. Notice that the first line of this paragraph is not even with the other lines. It is indented.

You may know, too, that a paragraph is a sentence or a group of sentences that tells about one main idea. Finding the main idea of a paragraph as you study is a good way to make sure that you understand what you read. But this is not always easy. The purpose of this lesson is to give you practice in recognizing the main idea of paragraphs.

Read the following paragraph:

I. People have found turtles that were more than thirty or forty years old. They knew this was true because of dates which had been carved on the turtles' shells. Many turtles live to be very, very old. It is said that the turtles around the Galápagos (gä lä'pä gös)



Islands, which are off the coast of South America, are the oldest living animals today. Some of them are nearly two hundred years old.

A sentence or a group of words that gives the main idea of a paragraph is called a paragraph heading. Which of the following headings is best for the paragraph you have just read?

1. *Turtles*
2. *The Oldest Animals in the World*
3. *The Age of Turtles*

The first heading is not good because it does not tell what special information about turtles is given in the paragraph. It is too general. The second heading is not good because it gives one detail of the paragraph instead of the main idea. It tells about only the last part of the paragraph. The third heading is best because it gives the topic or main idea of the paragraph.

For each of the following paragraphs tell which is the best paragraph heading and why you think it is the best.

II. Toads, frogs, snakes, turtles, and fish are cold-blooded animals. Unlike warm-blooded animals, the birds and mammals, they have no regular, or constant, temperature. Their temperature varies with their environment. It is much higher in warm than in cold weather. Cold-blooded animals have about the same temperature as the rocks, the soil, the grasses, the air, or the water where they happen to be. Places where



the temperature is about the same most of the time make splendid homes for them.

Which heading is best? Why?

1. *The Homes of Cold-blooded Animals*
2. *Some Cold-blooded Animals*
3. *The Temperature of Cold-blooded Animals*

III. When winter comes and their food supply is therefore limited, certain animals go to sleep. Then various changes occur in their bodies. Their mouths, noses, and eyes close tightly. Their hearts beat very slowly and feebly. Their breathing becomes fainter and fainter, until they seem not to breathe at all. The fat in their bodies is slowly used, and many of the animals grow thinner and thinner and lose weight.

They are still alive, but they are very, very sleepy and they remain very quiet. This is called hibernation.

Which heading is best? Why?

1. *Changes in Animals during Hibernation*
2. *Why Animals Grow Thinner*
3. *How Animals Keep Alive during Hibernation*

IV. Living things are almost everywhere on the earth—in the air, in the water, on the land, and even beneath the earth's surface. Most of them have many enemies, but they also have some means of protection. Some animals protect themselves by their great strength, often making use of powerful teeth and jaws, or perhaps of sharp beaks or claws. Certain kinds of snakes are armed with poison that is used to fight



an enemy or to kill other creatures for food. A few animals protect themselves with horns or antlers. Others use their tails—sometimes just to brush off annoying insects and sometimes, as in the case of large lizards, to strike powerful blows. A disagreeable odor is a good weapon against many enemies, especially man. Some animals are weak and timid, but they are able to run very rapidly. They protect themselves by escape.

Which heading is best? Why?

1. *Where Animals Live*
2. *What Dangers Surround Animals*
3. *How Animals Protect Themselves*

V. Some animals protect themselves by deceiving their enemies. Birds that would otherwise eat the viceroy butterfly keep away from it because it looks so much like the monarch butterfly, which has an unpleasant taste. Many insects look so much like the green leaves and twigs about them that their enemies do not notice them. Certain harmless beetles frighten other insects and even birds with their snapping pincers. The hognose snake “plays dead” by lying on his back with his mouth open and his tongue hanging out. Some crabs also “play dead” by becoming stiff and quiet when touched.

Which heading is best? Why?

1. *Animals That “Play Dead”*
2. *Protection by Deceiving Enemies*
3. *How the Colors of Animals Protect Them*

The Cabin on Mulberry Fork

Davy Crockett was the most famous hunter of his time and knew wild life as few men have known it. Thousands of stories of his adventures as a hunter have been told, some of them true, some only legends. He was born in Tennessee soon after the Revolutionary War, when only a few settlers had crossed the Blue Ridge Mountains to build cabins in the wilderness and when the Indians were still on the warpath. As the settlers pushed farther and farther to the West, Davy Crockett moved always into new lands. Whenever the country round about was becoming too well settled for wild game, Davy Crockett said: "I want my boys to grow up in new country and to learn to hunt. I want to hunt myself. It's best to move on."

The story of how Davy Crockett made a new home in the wilderness is told in the following pages. Read the story in order to answer these questions:

How was the journey to the new home made?

What kind of home was built in the clearing?

What kinds of wild game did Crockett find near the new home?

In the spring Davy Crockett packed a few pieces of household goods on two well-grown colts. Polly, his wife, and the two little boys rode the old horse, and with Davy and a pair of dogs on foot the family set out for a point on the Holston River, where they would continue their journey on a flatboat. This was the river country of the West, and most men traveled by the rivers when they could.

Travel by flatboat was the easiest way of pushing into new country where there were no roads and where trails were what they were often called—traces. The boats, of rough planking, were sometimes a hundred feet in length and could carry several families of settlers, with their horses, cattle, chickens, sheep, and goods.

Long wooden oars were set in the square bow, or front end, each pulled by two or more boatmen. A broad cabin was set in the middle of the deck, and a tall forked pole was fastened against its rear, reaching well above the flat roof. Through the fork a long oar slanted down over the square stern, or rear end, into the water and was used as a rudder by two or three boatmen standing on the roof, where they could see every turn of the stream.

The red-shirted river-boatmen kept up a running conversation with men ashore or on other boats along the river. They kept together, had their own manner of speech, their own jokes, and their own songs. Thousands of them were now afloat on the western rivers—noisy, quarrelsome, full of sport, gathering for short holidays when a journey was ended, and then away again up or down the rivers.

The waters of the Holston were high in spring, and it was a difficult task to steer the heavy boat. A collision of flatboats on a rapidly running stream was the danger. On rounding a bend the boatmen would blow great wooden horns, whose soft, sad notes were loved and remembered by many who traveled along the western rivers.

On open easy water the boatmen would sing out—

“Hard upon the beech oar!

She moves too slow!”

The air was full of boatmen's songs and full of talk. Flatboats, going up and down the rivers as shops, drew alongside the other boats to sell food or trinkets to the travelers.

The Holston poured into the broad, silver Tennessee, and then there were many winding miles to the southwest through fresh spring weather, past grassy valleys and open spaces, past groves of red maple, persimmon, tall sweet gum, and broad chestnut. The flatboat on which the Crocketts were traveling passed down the river between the ranges of the Cumberland Mountains. At last the Tennessee crossed a trail that ran crookedly over the mountains and down into the Elk River country.

Here the Crocketts left the flatboat, and their goods were packed again on the two colts. Polly mounted the old horse with the two little boys. Davy was on foot with the dogs at his heels. The journey was made over a rough steep trail, wet with spring rains. The views were fine and far, the mountainside rosy with laurel. Maypops grew in the woods, and fresh wild ginger.

Davy bought a little clearing at the head of the Mulberry Fork of the Elk River. He had come in time for planting. In putting up his small, windowless cabin he had the help of other settlers who came, sometimes from a distance, to help with logrolling. The cabin had a floor of earth, and a clay fireplace across one end. Later Crockett expected to have bearskins for rugs.





Bears were to be had in this region, though not in great enough numbers to please Crockett. The country had been hunted for years by the Indians, some of whom still lived there, and white men had also raided the forests. But wild turkeys were to be had, as well as possums and raccoons.

A few coonskins over a hunter's shoulder were like money jingling in his pocket. Two coonskins were worth a quarter, and two dozen could be traded for a good supply of flour and sugar.

Raccoons were fond of turtles' eggs, and in summer they would look for traces made by soft-shelled turtles as the turtles crawled over the sandy bottom of some quiet little creek. Stealthily the wary coons would follow these traces, walking along the banks until they discovered the eggs. Leaning over the clear water of a little stream or branch they would swiftly scoop up tadpoles with their paws. Troops of them would swiftly and quietly raid the cornfields, finding the sweet, milky young ears.

In autumn, when the woodpiles were larger than the cabins and the frost glimmered white, when the corn was still on the stalk, though its blades were dry, the raccoons prowled out of the woods at night, their eyes shining like green lights. Neat, wise, swift, they would climb the cornstalks, bending, breaking them, rapidly feasting on the yellow ears, making for the woods at the slightest rustle within the cabin or at the sound of a dog stirring.

On spring mornings that other thief, the possum, haunted the little streams or branches that flowed

through deep forests into Mulberry Creek, looking for young frogs, or pokeberry, or young nettle, and listening for the morning call of the wild turkey. It was the female's answer he wanted. Slipping toward her and following her to the nest, waiting for hours sometimes until she left it, he would get a chance to suck the eggs. Sly as a drop of snow, the possum was as great a thief around the clearing as the coon. He stole the eggs in the henhouse, and in autumn he topped off a good meal with grapes and ripe persimmons.

It was when the persimmons were in their most delicious state and the frost lay white on the ground that the possum, after so many juicy meals, himself became most excellent eating. Roast possum tasted like young pig.

Alone with his dogs or sometimes joining with one or two other hunters, Crockett was more often in the forests than on his little farm. The dogs would pick up a scent and with their bell voices would be gone through the woods, the clear notes of the hunting horn urging them on. Young Crockett could raise his own strong voice in a high call that floated far along the air and roused the dogs as keenly as the horn. Hunters said that he knew how to throw his voice so that it would follow his dogs along the ground between ridges of the hills, and that his hunting call could travel even round the shoulder of a steep bluff.

Then would come the deep, full baying of the dogs. "Treed!" Crockett would cry and be off full swing through woods and bottom land.

The scent was not always hot. Sometimes there





were so many traces of it as to confuse the dogs, for wary raccoons would circle and cut in on their own tracks to throw them off. When dogs were barking up a great oak, the coon could slip into the upper branches where leaves hung thick, and it was a puzzle to find him with his rings and stripes as he lay curled round the farther side of a limb. But Crockett was long-sighted, sure of aim, ready to guess what a coon would do.

"Crockett can outsmart 'most any coon or possum," his neighbors said.

He soon had enough coonskins to trade for supplies at the neighboring store and enough sweet possum meat to keep his boys round and fat.

Hunting far into the forests he sometimes shot a black bear; so when winter came, dried bear meat hung from the rafters of the little cabin. The corn pone was full of cracklings, with wild honey eaten with it for a treat. There were plenty of warm fox furs for caps, deerskin for leggings, coonskins for coats, and furs to pile on the beds at night.

Constance Rourke

Using a List of Topics to Help Recall What You Read

How well can you answer the questions that guided your reading? A list of the topics covered by these questions will be helpful in testing how much you remember about them. Here is the first question and the list of topics about it:

How Was the Journey to the New Home Made?

The trip to the river

The flatboats

The boatmen

The dangers and pleasures of travel by flatboat

The journey by trail

List the points that you remember about the first topic, *The trip to the river*. Now turn back to page 95 and read to find important ideas that you did not remember. In the same way, see how well you remember the other topics.

Making a List of Topics to Use as an Aid in Recall

Make your own list of the topics covered by each of the other two questions and then use the lists as an aid in answering the questions.

What kind of home was built in the clearing?

What kinds of wild game did Crockett find near the new home?

Do not try to make the lists from memory. Refer to the book as you work.

Interesting Words to Explain

Can you explain the words underlined in the sentences given below? The words underlined in the first two sentences are used in the last four paragraphs of the story. Read this part of the story again. Discuss the meaning of each underlined word with your classmates. If you cannot decide upon a good explanation for each word, choose a member of the class to look up the meanings in a large dictionary. You may not find these words in your small dictionary.

1. Crockett could outsmart 'most any coon or possum.
2. Crockett was long-sighted.

If, after having read the story, you cannot give a good explanation for the words underlined in the next group of sentences, use the dictionary for help. You will be able to find these words in most small dictionaries.

3. The corn pone was full of cracklings.
4. Stealthily the wary coons would follow the traces of the turtles.
5. Dried bear meat hung from the rafters of the cabin.
6. "Treed!" Crockett would cry when he heard the deep, full baying of the dogs.
7. It was when the persimmons were in their most delicious state that the possum himself became most excellent eating.
8. A long oar slanted down over the square stern into the water and was used as a rudder.

The words underlined in the last nine sentences are used frequently and are probably familiar to all of you. In these sentences, however, they have rather unusual meanings. Read each sentence carefully, think about what it means, and then decide upon a good explanation for each underlined word. Your small dictionary may not be of much help, for it probably will not give the exact meaning of every one of these words as they are used in the sentences.

9. The red-shirted boatmen kept up a running conversation with men ashore or on other boats along the river.

10. The possum topped off his meal with grapes and ripe persimmons.

11. Travel by flatboat was the easiest way of pushing into a new country where there were no roads.

12. The scent was not always hot.

13. The dogs would pick up a scent and with their bell voices would be gone through the woods.

14. Hunters said that he knew how to throw his voice so that it would follow the dogs along the ground between ridges of the hills.

15. On open easy water the boatmen would sing out—

“Hard upon the beech oar!
She moves too slow!”

16. Davy bought a little clearing at the head of the Mulberry Fork of the Elk River.

17. He soon had enough sweet possum meat to keep his boys round and fat.

How a Dictionary Helps You to Pronounce Words

One of the principal uses you can make of the dictionary is to learn the correct pronunciation of words. The dictionary helps you to do this in five ways.

1. The dictionary divides the words into parts called *syllables*. When you see a word divided into syllables, you can pronounce each syllable and then you can pronounce the entire word more easily. Say these words softly to yourself by syllables. Then say the entire word. Later your teacher may call on different pupils to pronounce the words aloud.

pre vent	in flu ence	de struc tion	de vel op ment
rub bish	glit ter ing	ob ser va tion	pro nun ci a tion

2. The dictionary places *accent marks* after the syllables that should be emphasized or stressed in pronunciation. Sometimes only one syllable has an accent mark, as in the word *pop' u lar*. Often, however, more than one syllable has an accent mark. In such a case, one mark is usually heavier than the others. Notice the word *pop' u lar' i ty*. The first syllable is stressed slightly; so a light accent mark is used. The third syllable is stressed more heavily; so a heavy accent mark is used. Say the following words softly to yourself, taking care to place the accent on the right syllable or syllables.

cli'mate	his tor'i cal	char'coal'	ex'pe di'tion
com mu'ni ty	rhi noc'er os	seal'skin'	des'ti na'tion

3. Often a word is *respelled* in the dictionary in order to make it easier to pronounce. Here is the way a few words are respelled:

dumb (dŭm)	know (nō)
clue (klōō)	prairie (prâr'ī)
frequent (frē'kwěnt)	million (mīl'yŭn)

The sounds that should be given to certain letters are shown by little lines, dots, or other marks. These marks are called *diacritical* (dī'á krĭt'ī kăł) marks. A key in the front of the dictionary explains the sound each mark gives to each letter or group of letters. As you use a dictionary more and more, you will learn what these marks mean. The common ones are easy. For example, the straight horizontal line (–) over *a*, *e*, *i*, *o*, or *u* means that a long sound is given to the letter, as in *ale*, *eve*, *ice*, *old*, and *cube*. A little curved line, like this (˘), means that a short sound is given to the letter, as in *add*, *end*, *ill*, *odd*, and *up*.

4. Some words may be pronounced correctly in more than one way. The dictionary may give two or more respellings for such words. The first one is, as a rule, the best or preferred pronunciation. What is the preferred pronunciation for the following word?

either (ē'thěr ; ĭ'thěr)

5. The *key words* are the easy words in small type at the top or bottom of the dictionary page. Find the key words in the sample dictionary page given on page 60 of this book. These key words have the diacritical marks and are given to remind you how certain

letters should sound in the harder words. In the list below notice the diacritical mark over the *a* in *gasoline*. Find the key word that has the same kind of mark over the *a*. This tells you that the *a* in *gasoline* sounds like the *a* in *add*. Now notice the diacritical mark over the *a* in *radio*. Find the key word with the same kind of mark over *a*. The key word *ale* is an easy word that helps you to pronounce the *a* in *radio*.

Pronounce each word in the list below. Use the key words on page 60 whenever you need help.

gasoline (găs'ô·lên)	plague (plāg)
radio (rā'dī·ō)	illegible (īl·lēj'z·b'l)
locomotive (lō'kô·mō'tīv)	aniline (ăn'z·līn ; -līn ; -lên)
aqueduct (ăk'wê·dŭkt)	utensil (û·tên'sīl ; û·tên's'l)

Find the word *possibility* on the sample page. Which key words help you to pronounce it correctly?

Learn how to pronounce each of the following words given on the sample page. What is interesting about the accents in the last two words?

posterity	postlude	posthaste
posse	postpone	postpaid

Words Commonly Mispronounced

Below is a list of words that are often mispronounced. Use a dictionary to learn the correct pronunciation for each one.

hundred	interesting	column
eleven	finally	government
just	library	athlete

An Insect Enemy

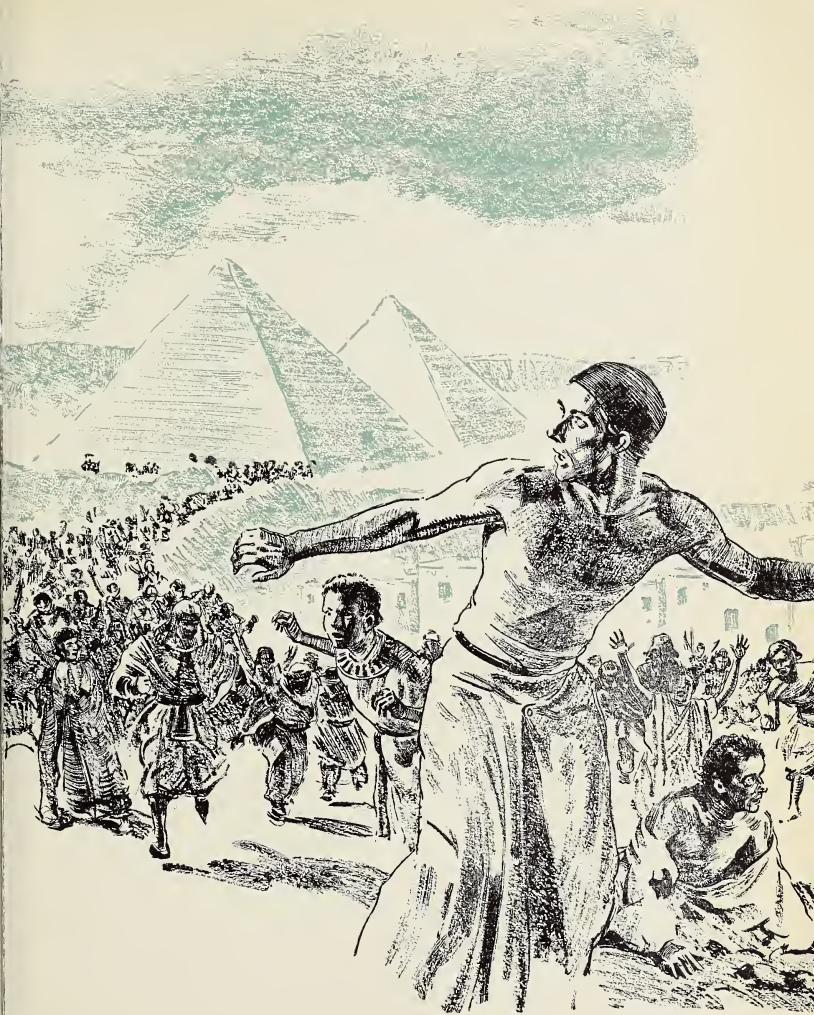
Part I of "An Insect Enemy" is a short account of the damage done by grasshoppers in the past. Part II tells how these insect pests have threatened farmers in more recent times.

I. GRASSHOPPER PLAGUES OF PAST TIMES

In ancient times and on through history to the present, one of man's worst insect enemies has been the grasshopper. Some grasshoppers do little harm, but there are kinds that sometimes appear in such tremendous numbers and do so much damage that people speak of them as a "plague of grasshoppers." A *plague* is something that causes great trouble. As you read the lesson, decide why it is a good word to use in this case.

The grasshopper is one of the most important insects in the world. This is not just because it is widely used as food in some countries, but because it has so often played tragic parts in the life of man—has so often brought him hunger, sickness, and death. Millions of men in many lands, since time began, have died through starvation caused by the grasshopper, and especially by the kind called locust. The locust has played no small part in the history of the world.

The Bible tells of the locusts, or grasshoppers, in Egypt that "covered the face of the whole earth, so that the land was darkened, and they did eat every herb." History records many such visits. In Roman



times there were fine cities on the north coast of Africa. But now and again grasshopper swarms from inland were swept to sea by the winds. There they drowned in uncounted millions and washed ashore, so that there were piles of them four or five feet high along the beaches, reaching for hundreds of miles. Sickness followed, and thousands of people died.

There are many grasshoppers in Africa. Within its great waste areas they hatch in huge numbers. From time to time swarms of them sweep down on the countries along the northern coast, destroying the crops and bringing starvation.

Sometimes they ride the winds and cross over large bodies of water, such as the Mediterranean Sea, and great stretches of land. History shows that these visits were made now to Italy, now to Spain, now to France. In 1744 all Europe was swept by grasshoppers from Africa. They stayed for years, the swarms sweeping as far north as Sweden.

In 1825 a traveler journeying from Moscow to southern Russia reported meeting such masses of the insects on the ground that his carriage dragged as heavily as though the earth were freshly plowed; these swarms continued for four hundred miles.

A wanderer in India in 1811 met a swarm of grasshoppers which was forty miles across and took three days to pass. In a single city in their track, half the population of 200,000 died as a result of this attack. Wherever they passed there was no food left for man or beast.

In 1876 the United States felt the worry and suf-

fering caused by grasshoppers. Swarms of them rose from the waste lands where the Great Plains rise into the Rocky Mountains; they went on for days and weeks without stopping, flying distances as great as 1000 miles. They reached those areas in Kansas and its neighbor states where fertile farms had been developed, and rich crops were nearly ready for harvesting. Here the insects stopped and ate every living blade of grass, every leaf and twig. They left the farmer nothing for the harvest. They left nothing upon which his cattle and horses might feed. They swept the country clean, leaving ruin behind them. The loss because of this visit was placed at \$200,000,000.

The grasshoppers disappeared at last, but there remained in the breast of the Western wheat farmer a haunting fear that maybe, the next year or the next, the grasshoppers would return and ruin would again pass across the plains and prairies.

William Atherton DuPuy

II. A PRESENT-DAY MENACE

Everyone is interested in what hurts the farmer, because he supplies our food. Newspapers and magazines have many articles about what is happening on the farms. No doubt you see them in your newspaper. Here is an article that appeared in the *Literary Digest* in April, 1937. It tells what people at that time thought about the grasshoppers.

A *menace* is something that threatens serious danger. Be ready to tell why it is a good word to use in the title of this article.

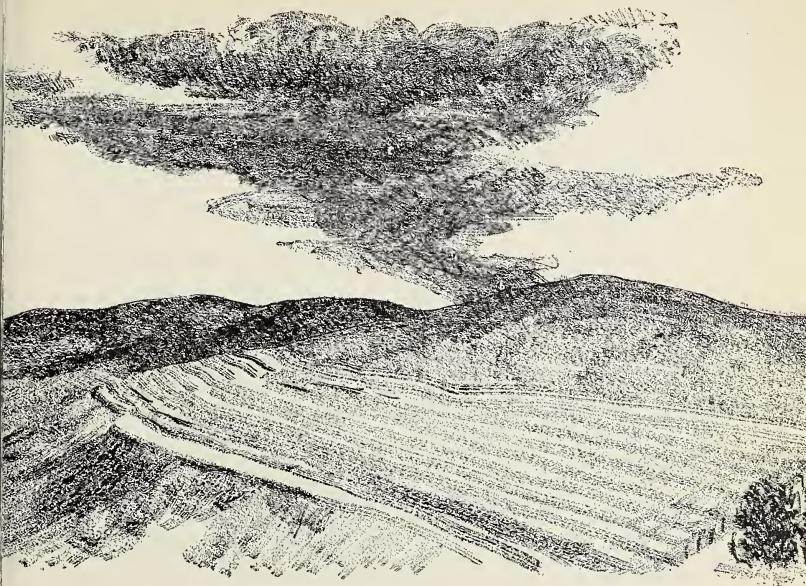
Ten Midwestern states now face a menace to their prosperity as great as the drought, dust storms, and other ills through which American farmers have struggled bravely in recent years.

For the next two months farmers in these states will watch the weather with unusual care.

And here is why:

Billions upon billions of young grasshoppers that





may destroy thousands of square miles of growing crops are hatching in the West.

Unless there is an unusually wet or cold spring, these ancient enemies of the farmer may be expected to darken the sky of the Midwest this summer, destroying nearly every growing thing in their path.

Warning to the threatened farmers of Montana, the Dakotas, Wyoming, Colorado, Nebraska, Missouri, Iowa, Illinois, and Kansas was broadcast on April 6th.

Since last fall, scientists have known that 1937 was likely to go into history as a "hopper year."

Grasshoppers lay their eggs underground, and tests of their numbers are made by counting eggs dug up

over given sections and thereby estimating totals per square mile. As early as last fall such estimates showed that dangerously large numbers of eggs had been laid in many regions.

The scientists of some states have gone so far as to warn against the greatest grasshopper menace "in modern times."

However, normal dry, warm weather is needed for young 'hoppers to reach their full growth. Cold or wet means death to billions. Even though such weather may hinder the growth of crops, it is what the threatened people are praying for now.

Naturally, modern farming has other ways of defending itself against the pests than the uncertain chance of wet weather. The second-best method of fighting the grasshoppers is the spreading of poison bran. This mops up the grasshoppers who live through wet weather, and in case of dry weather kills millions of them, especially if it is used early in the season, when the insects start feeding.

In addition to money spent by the states, Congress voted to spend \$2,000,000 in carrying on the 'hopper war.

In their ability to destroy growing plants there is little difference between the American grasshopper and the locust of past ages. To the farmer of that day, the locusts were very likely to mean great shortage of food and perhaps death. Today the farmers will not starve, but they may need relief or aid from the government in order to live.

From The Literary Digest

How Well Do You Remember What You Read?

Give the answers to as many of the following questions as you can. When you have done this, turn again to Part I and Part II of this lesson. Check all your answers to see whether they are right, and find information about any questions that you were unable to answer.

1. How do grasshoppers bring hardship and even starvation to people?

2. In what part of the United States do grasshoppers do most damage?

3. Can grasshoppers cross large bodies of water?

4. How far were grasshoppers said to fly when they appeared in the Middle West in 1876?

5. What kind of weather is needed to kill young grasshoppers?

6. How can scientists tell that the farmers are facing a bad grasshopper year?

7. What is a good way to fight grasshoppers?

8. Why do the farmers not depend upon the weather in their war against grasshoppers?

9. Who helps the farmers fight their war on grasshoppers?

10. What is the earliest record of a plague of locusts that this lesson mentions?

11. How did a wanderer in India describe the size of a swarm of grasshoppers?

12. When is the best time to spread the poison for killing grasshoppers?

13. Why are people who live in cities affected by the damage done by grasshoppers?

14. What do the words *plague* and *menace* mean?



The Glittering Cloud

"The Glittering Cloud" is one chapter of a book called *On the Banks of Plum Creek*. The book tells about the adventures of a real family who made a new home on a farm in the Middle West over sixty years ago. See how quickly you can discover what the glittering cloud is. Decide whether you think this is a good name for the story.

Now the wheat was almost ready to cut.

Every day Pa looked at it. Every night he talked about it and showed Laura some long, stiff wheat heads. The plump grains were getting harder in their little husks. Pa said the weather was perfect for ripening wheat.

"If this keeps up," he said, "we'll start harvesting next week."

The weather was very hot. The thin, high sky was too hot to look at. Air rose up in waves from the whole prairie, as it does from a hot stove. In the schoolhouse the children panted like lizards, and the sticky pine juice dripped down the board walls.

Saturday morning Laura went walking with Pa to look at the wheat. It was almost as tall as Pa. He lifted her onto his shoulder so that she could see over the heavy, bending tops. The field was greeny gold.

At the dinner table Pa told Ma about it. He had never seen such a crop. There were forty bushels to the acre, and wheat was a dollar a bushel. They were rich now. This was a wonderful country. Now they

could have anything they wanted. Laura listened, and thought, now Pa would get his new boots.

She sat facing the open door and the sunshine streaming through it. Something seemed to dim the sunshine. Laura rubbed her eyes and looked again. The sunshine really was dim. It grew dimmer until there was no sunshine.

"I do believe a storm is coming up," said Ma. "There must be a cloud over the sun."

Pa got up quickly and went to the door. A storm might hurt the wheat. He looked out; then he went out.

The light was queer. It was not like the changed light before a storm. The air did not press down as it did before a storm. Laura was frightened, she did not know why.

She ran outdoors, where Pa stood looking up at the sky. Ma and Mary came out, too, and Pa asked, "What do you make of that, Caroline?"

A cloud was over the sun. It was not like any cloud they had ever seen before. It was a cloud of something like snowflakes, but they were larger than snowflakes, and thin and glittering. Light shone through each flickering particle.

There was no wind. The grasses were still and the hot air did not stir, but the edge of the cloud came on across the sky faster than wind. The hair stood up on Jack's neck. All at once he made a frightful sound up at that cloud, a growl and a whine.

Plunk! Something hit Laura's head and fell to the ground. She looked down and saw the largest grass-

hopper she had ever seen. Then huge brown grasshoppers were hitting the ground all around her, hitting her head and her face and her arms. They came thudding down like hail.

The cloud was hailing grasshoppers. The cloud *was* grasshoppers. Their bodies hid the sun and made darkness. Their thin, large wings gleamed and glittered. The harsh whirring of their wings filled the whole air, and they hit the ground and the house with the noise of a hailstorm.

Laura tried to beat them off. Their claws clung to her skin and her dress. They looked at her with bulging eyes, turning their heads this way and that. Mary ran screaming into the house. Grasshoppers covered the ground; there was not one bare bit to step on. Laura had to step on grasshoppers, and they smashed squirming and slimy under her feet.

Ma was slamming the windows shut, all around the house. Pa came and stood just inside the front door, looking out. Laura and Jack stood close beside him. Grasshoppers beat down from the sky and swarmed thick over the ground. Their long wings were folded, and their strong legs took them hopping everywhere. The air whirled, and the roof went on sounding like a roof in a hailstorm.

Then Laura heard another sound, one big sound made of tiny nips and snips and gnawings.

"The wheat!" Pa shouted. He dashed out of the back door and ran toward the wheat field.

The grasshoppers were eating. You could not hear one grasshopper eat, unless you listened very carefully





while you held him and fed him grass. Millions and millions of grasshoppers were eating now. You could hear the millions of jaws biting and chewing.

Pa came running back to the stable. Through the window Laura saw him hitching Sam and David to the wagon. He began pitching old dirty hay from the manure pile into the wagon, as fast as he could. Ma ran out, took the other pitchfork, and helped him. Then he drove away to the wheat field, and Ma followed the wagon.

Pa drove around the field, throwing out little piles of stuff as he went. Ma stooped over one, then a thread of smoke rose from it and spread. Ma lighted pile after pile. Laura watched till a cloud of smoke hid the field and Ma and Pa and the wagon.

Grasshoppers were still falling from the sky. The light was still dim, because grasshoppers covered the sun.

Ma came back to the house, and in the closed lean-to she took off her dress and her petticoats and killed the grasshoppers she shook out of them. She had lighted fires all around the wheat field. Perhaps smoke would keep the grasshoppers from eating the wheat.

Ma and Mary and Laura were quiet in the shut, smothery house. Carrie was so little that she cried, even in Ma's arms. She cried herself to sleep. Through the walls came the sound of grasshoppers eating.

The darkness went away. The sun shone again. All over the ground was a crawling, hopping mass of grasshoppers. They were eating all the soft, short grass off

the little hill. The tall prairie grasses swayed and bent and fell under the weight of the grasshoppers.

"Oh, look," Laura said, low, at the window.

They were eating the willow tops. The willows' leaves were thin, and bare twigs stuck out. Then whole branches were bare, and knobby with masses of grasshoppers.

"I don't want to look any more," Mary said, and she went away from the window. Laura did not want to look any more, either, but she could not stop looking.

The hens were funny. The two hens and their gawky young ones were eating grasshoppers with all their might. They were used to stretching their necks out low and running fast after grasshoppers and not catching them. Every time they stretched out now, they got a grasshopper right then. They were surprised. They kept stretching out their necks and trying to run in all directions at once.

"Well, we won't have to buy feed for the hens," said Ma. "There's no great loss without some gain."

The green garden rows were wilting down. The potatoes, the carrots, the beets, and the beans were being eaten away. The long leaves were eaten off the cornstalks; and the tassels and the ears of young corn in their green husks fell, covered with grasshoppers.

There was nothing anybody could do about it.

Smoke still hid the wheat field. Sometimes Laura saw Pa moving dimly in it. He stirred up the smouldering fires, and thick smoke hid him again.

When it was time to go for Spot, Laura put on stockings and shoes and a shawl. Spot was standing in the

old ford of Plum Creek, shaking her skin and switching her tail. Laura was sure that cattle could not eat grass so full of grasshoppers. If the grasshoppers ate all the grass, the cattle would starve.

Grasshoppers were thick under her petticoats and on her dress and shawl. She kept striking them off her face and hands. Her shoes and Spot's feet crunched grasshoppers.

Ma came out in a shawl to do the milking. Laura helped her. They could not keep grasshoppers out of the milk. Ma had brought a cloth to cover the pail, but they could not keep it covered while they milked into it. Ma skimmed out the grasshoppers with a tin cup.

Grasshoppers went into the house with them. Their clothes were full of grasshoppers. Some jumped onto the hot stove where Mary was starting supper. Ma covered the food till they had chased and smashed every grasshopper. She swept them up and shoveled them into the stove.

Pa came into the house long enough to eat supper while Sam and David were eating theirs. Ma did not ask him what was happening to the wheat. She only smiled and said: "Don't worry, Charles. We've always got along."

Pa's voice was husky, and Ma said: "Have another cup of tea, Charles. It will help get the smoke out of your throat."

When Pa had drunk the tea, he went back to the wheat field with another load of old hay and manure.

In bed, Laura and Mary could still hear the whir-

ring and snipping and chewing. Laura felt claws crawling on her. There were no grasshoppers in bed, but she could not brush the feeling off her arms and cheeks. In the dark she saw grasshoppers' bulging eyes and felt their claws crawling until she went to sleep.

Pa was not downstairs next morning. All night he had been working to keep the smoke over the wheat, and he did not come to breakfast. He was still working.

The whole prairie was changed. The grasses did not wave; they had fallen in ridges. The rising sun made all the prairie rough with shadows where the tall grasses had sunk against each other.



The willow trees were bare. In the plum thickets only a few plum pits hung to the leafless branches. The nipping, clicking, gnawing sound of the grasshoppers' eating was still going on.

At noon Pa came driving the wagon out of the smoke. He put Sam and David into the stable, and slowly came to the house. His face was black with smoke and his eyeballs were red. He hung his hat on the nail behind the door and sat down at the table.

"It's no use, Caroline," he said. "Smoke won't stop them. They keep dropping down through it and hopping in from all sides. The wheat is falling now. They're cutting it off like a scythe. And eating it, straw and all."

He put his elbows on the table and hid his face with his hands. Laura and Mary sat still. Only Carrie on her high stool rattled her spoon and reached her little hand toward the bread. She was too young to understand.

"Never mind, Charles," Ma said. "We've been through hard times before."

Laura looked down at Pa's patched boots under the table, and her throat swelled and ached. Pa could not have new boots now.

Pa's hands came down from his face, and he picked up his knife and fork. His beard smiled, but his eyes would not twinkle. They were dull and dim.

"Don't worry, Caroline," he said. "We did all we could, and we'll pull through somehow."

Then Laura remembered that the new house was not paid for. Pa had said he would pay for it when he harvested the wheat.

It was a quiet meal, and when it was over Pa lay down on the floor and went to sleep. Ma slipped a pillow under his head and laid her finger on her lips to tell Laura and Mary to be still.

They took Carrie into the bedroom and kept her quiet with their paper dolls. The only sound was the sound of the grasshoppers' eating.

Day after day the grasshoppers kept on eating. They ate all the wheat and the oats. They ate every green thing—all the garden and all the prairie grass.

"Oh, Pa, what will the rabbits do?" Laura asked. "And the poor birds?"

"Look around you, Laura," Pa said.

The rabbits had all gone away. The little birds of the grass tops were gone. The birds that were left were eating grasshoppers. And prairie hens ran with outstretched necks, gobbling grasshoppers.

When Sunday came, Pa and Laura and Mary walked to Sunday school. The sun shone so bright and hot that Ma said she would stay at home with Carrie, and Pa left Sam and David in the shady stable.

There had been no rain for so long that Laura walked across Plum Creek on dry stones. The whole prairie was bare and brown. Millions of brown grasshoppers whirled low over it. Not a green thing was in sight.

All the way, Laura and Mary brushed off grasshoppers. When they came to the church, brown grasshoppers were thick on their petticoats. They lifted their skirts and brushed them off before they went in. But careful as they were, the grasshoppers had spit dark-brown juice on their best Sunday dresses.

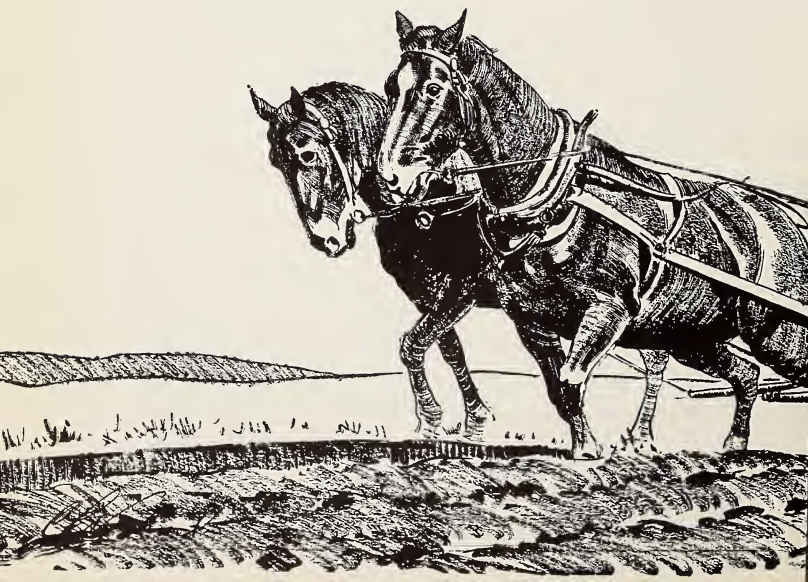
Nothing would take out the horrid stains. They would have to wear their best dresses with the brown spots on them.

Many people in town were going back East. Christy and Cassie had to go. Laura said good-by to Christy, and Mary said good-by to Cassie, their best friends.

They did not go to school any more. They must save their shoes for winter, and they could not bear to walk barefooted on grasshoppers. School would be ended soon anyway, and Ma said she would teach them through the winter so that they would not be behind their classes when school opened again next spring.

Pa worked for Mr. Nelson and earned the use of Mr. Nelson's plough. He began to plough the bare wheat field, to make it ready for next year's wheat crop.

Laura Ingalls Wilder



Securing Information from a Story

1. Glance quickly over the story again to find

a. Why the pioneer family expected to have a good wheat crop.

b. What damage the grasshoppers did.

2. Just before "The Glittering Cloud" you read another lesson about grasshoppers. What new information about grasshoppers did you learn from this story of a pioneer family?

3. The author has used many words and phrases that help us to understand better the surprise and fear and grief that the pioneer family felt when the grasshoppers came. For example, she speaks of the grasshoppers "thudding down like hail," the "shut, smothery house," and the branches "knobby with masses of grasshoppers." Make a list of eight or ten groups of words that are such good descriptions that they make the story seem real.



Using Different Kinds of Books

Almost everyone likes to read stories about people of other times and other places. If the story is a true one or is one that might really have happened, it gives us a feeling and a kind of understanding that we do not get from a book which gives us just facts. One reason may be that we are interested in the characters, which the author may describe so well that they seem like real people. Another reason probably is that there is more space in a story for interesting details and adventures.

Both books that tell stories and books that give information without stories are good to read. They help us in different ways. Books such as your history textbook give you clear and accurate information. Books that tell stories may help to make the facts you learn seem more real.

A number of questions are listed below. Which ones are answered in "An Insect Enemy"? Which are answered in "The Glittering Cloud"? Call "An Insect Enemy" Lesson A, and "The Glittering Cloud" Lesson B. Number from 1 to 17 on your paper and after each number give the lesson in which the answer is found. The first one should look like this:

1. A

1. Has Congress ever voted money for fighting grasshoppers?

2. What did one pioneer family have to do without because of the coming of the grasshoppers?

3. How much damage did grasshoppers do in 1876?
4. How did the grasshoppers sound as they swarmed around Laura's house?
5. What are some countries in which grasshoppers have done serious damage?
6. Where do grasshoppers lay their eggs?
7. How did the animals on Laura's farm behave when the grasshoppers came?
8. Do grasshoppers ever get inside people's houses?
9. Have grasshoppers been a menace for hundreds of years?
10. What kind of weather helps to kill young grasshoppers?
11. Did Laura's mother help fight the grasshoppers?
12. How did the prairie near Laura's home look after the grasshoppers came?
13. What ways of fighting grasshoppers have scientists discovered?
14. What does the Bible tell about a plague of grasshoppers?
15. How far have swarms of grasshoppers been known to travel?
16. Did smoke keep the grasshoppers from eating the wheat?
17. Are there many grasshoppers in Africa?

Discuss the answers to the questions. If you cannot remember an answer, look it up.

Discuss with your classmates some of the differences and the likenesses in the kinds of information given in Lesson A and Lesson B.

Practice in Making Outlines

Because outlining is such a good way to organize what you read and because it helps you to remember, it is a good thing to learn to do it well. You have probably had some practice in making outlines in earlier grades. The purpose of this lesson is to give you more skill in making outlines.

First read the following paragraph that tells how American wild life has been destroyed.

I. When white people first came to the United States wild animals and birds were plentiful. So many of them were destroyed, however, that today some kinds have almost disappeared; others live only in parks or other special places; and still others have disappeared entirely. Large numbers of animals were killed for their valuable furs and skins. Birds were hunted for their bright feathers, which were used to trim women's hats. Both animals and birds were hunted for food. Thousands of animals and birds were killed by hunters just for sport. Some animals and birds, of course, were killed for several reasons. When the West was being settled, for example, thousands of buffaloes were killed, partly for their hides, partly for food, and partly for sport. Many animals lost their homes as more and more forests were cut down and, as a result, their numbers grew smaller and smaller. Thousands of birds have lost their nesting and feeding places as marshes and swamps have been drained for farming land.

The paragraph you have just read tells why American wild life has decreased. Six reasons are given. Read the paragraph again and see if you can find these six reasons.

The six reasons are subheadings, or subpoints, that help to develop the main idea of the paragraph. They are given below in outline form:

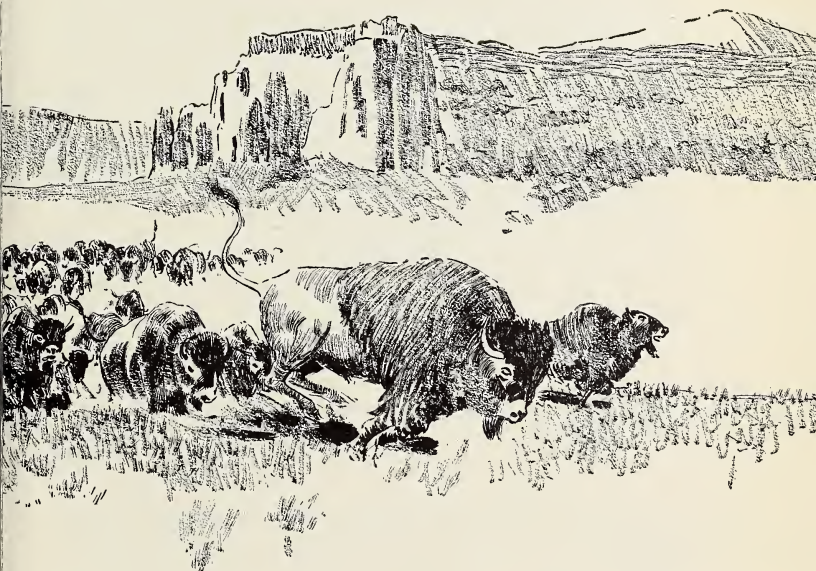
I. Why the number of animals and birds has decreased

- A. Animals killed for furs and skins
- B. Birds hunted for feathers
- C. Animals and birds hunted for food
- D. Animals and birds killed for sport
- E. Animals lost their homes
- F. Birds lost their nesting and feeding places

For each of the following paragraphs find the subpoints in the same way. Copy on your paper the paragraph heading just as it is given below the paragraph, and make an outline by filling in the subpoints. Your outline should be short. It is not necessary to write whole sentences. *Do not write in this book.*

II. As soon as people who were interested in birds and animals realized that American wild life was in danger of being destroyed, they began to make plans for its protection. Today, through the efforts of thousands of people, much is being done to save the wild life of our country. Laws have been passed to protect animals and birds from hunters. For example, in some states deer may be killed only at certain times of the year and moose may not be killed at all. Places have





been set aside where animals and birds are protected. The wild life in the national parks, for example, is under the protection of the Federal government. In other places, large areas of land, called bird sanctuaries, have been set aside as nesting places and homes. Here birds can be safe. Many of these sanctuaries are located along the routes followed by birds as they migrate. Studies are being made of the best ways to care for and to protect wild life. Many societies and clubs have been organized for the purpose of preserving America's wild animals and birds.

II. What is being done to save the wild life of America

- A.
- B.
- C.
- D.

III. Soil is the first thing necessary for farming, and farming is one of our chief industries. Erosion, which is the washing or blowing away of the soil, is therefore a serious problem. Water washes away the thin sheets or layers of soil at the surface of the land. When this has happened little furrows or gullies may form in the hillsides or on sloping land. Rains make these gullies wider and deeper and destroy both pastures and fields. Wind erosion happens naturally, but it becomes more serious when the wind blows across plowed fields and overgrazed pastures. It is most serious in times of very dry weather, when large quantities of soil are carried away.

III. Two causes of soil erosion

A.

B.

IV. Today hundreds of men are fighting the needless waste of soil and water in America. Neither man nor nature has found a better weapon than grass. Grass anchors soil so that in times of heavy rainfall it cannot easily wash away. The decaying remains of grass make the soil act like a sponge which is able to soak up water. The roots of the grass open tiny passageways that allow the water to run into the earth. Its blades and stalks are countless tiny dams which check the downhill flow of fallen rain. Slow water does little damage; grass makes running water creep.

IV. How grass helps to prevent the loss of soil and water

A.

B.

C.

D.

V. The control of our water supply is an important public problem, not only because of the damage done by floods and heavy rains but also because of the many uses of water. One of its most important uses is as drinking water for people. Tremendous quantities are used for household purposes, for fire protection, and for getting rid of wastes. Think of providing a city having over 1,000,000 people with an average supply of 150 gallons per person each day. Water has other

uses too. Field crops could not grow without it. Cattle and other livestock must have it to drink. Water is used for developing electric power, which aids industry and brings comfort and convenience to millions of people. Do you wonder that people are interested in a plentiful water supply?

V. The uses of water

- A.
- B.
- C.
- D.
- E.
- F.
- G.

VI. From the earliest times wells have been one of the chief sources of drinking water. Nearly all farmhouses and small towns still get their water from wells. Cities located on rivers sometimes draw their drinking water from them. Such water may contain harmful bacteria, and care must be taken to make it safe for use. Other cities pipe their water from lakes in the hills and mountains many miles away. Still others get their water supply from reservoirs which are formed by building a huge dam across a mountain stream and thus making a large artificial lake.

VI. Sources of drinking water

- A.
- B.
- C.
- D.

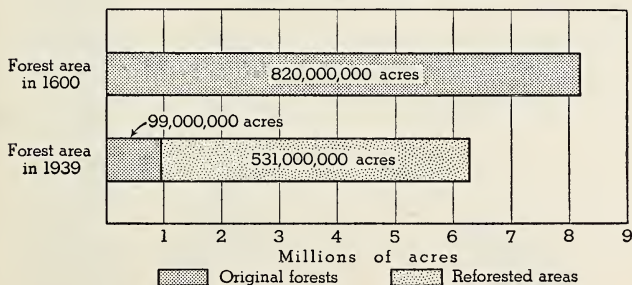
National Forests

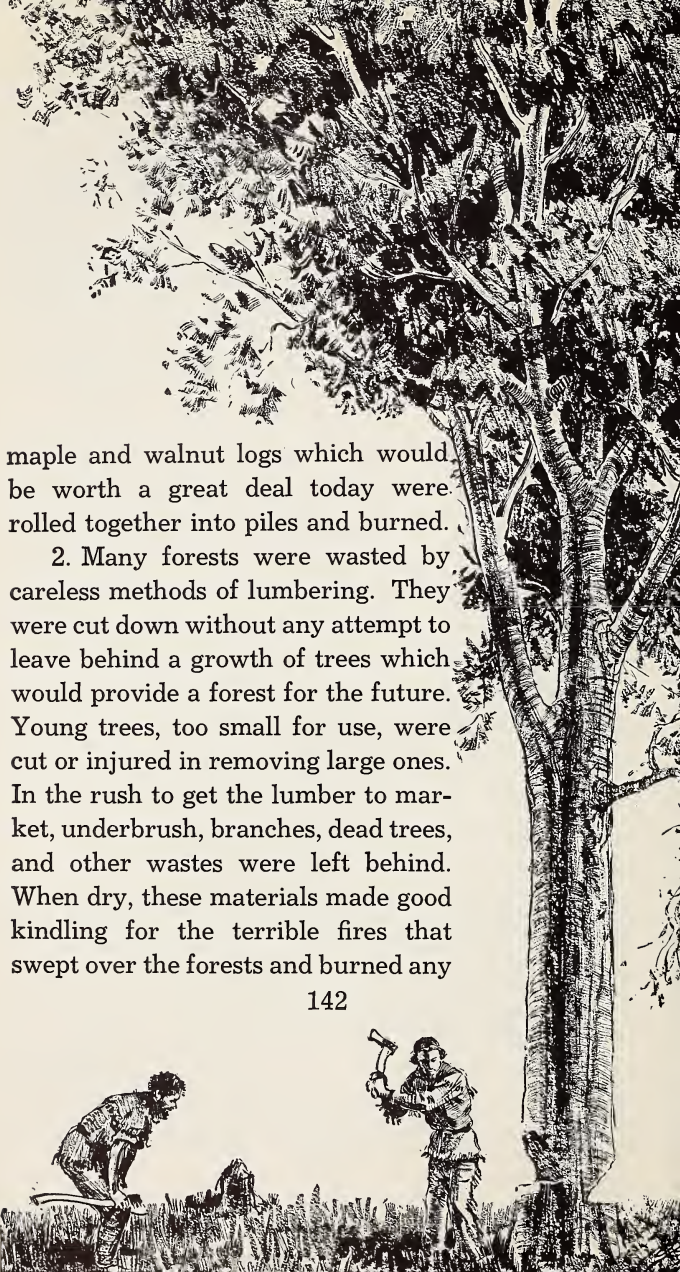
This lesson tells about the national forests of the United States. As you read it, see how much you can find about these three questions:

1. How did the United States get its national forests?
2. In what ways are the national forests valuable to the people of the United States?
3. How does the government care for the forests?

1. Early settlers in America found most of the land from the Atlantic to the Mississippi an unbroken forest. Because they had to clear the land before they could plow it and plant grain, much of this great forest was wasted. Miles and miles of woodland were burned off, or the trees were cut down to make room for farms. As the pioneers moved westward the great forests of the Ohio valley were cut, not because the lumber was needed but because the land had to be cleared for farms. The lumber could not be shipped away, because there were no railroads. Hundreds of

Forests of the United States





maple and walnut logs which would be worth a great deal today were rolled together into piles and burned.

2. Many forests were wasted by careless methods of lumbering. They were cut down without any attempt to leave behind a growth of trees which would provide a forest for the future. Young trees, too small for use, were cut or injured in removing large ones. In the rush to get the lumber to market, underbrush, branches, dead trees, and other wastes were left behind. When dry, these materials made good kindling for the terrible fires that swept over the forests and burned any



live trees that remained. This waste continued until nearly half the forests of the United States were gone.

3. Forests should be protected not only for their lumber, but also because they help to control the flow of water after rains. When the forests are cut off and there is nothing to hold the water back, it washes valuable soil from the hillsides and rushes on, turning the streams into raging torrents and causing a great deal of damage. The underbrush, vines, creepers, ferns, grass, and leaf mold form a sort of sponge which holds water in the ground. This prevents floods by keeping the water from running off rapidly after heavy rains. In forest land the water slowly seeps through the soil and finds its way to the streams, feeding them regularly all through the year. It is important to keep the flow of water regular, if streams are to be useful for furnishing water power.

4. When people began to realize the value of the forests, they decided that they must be protected. There were four main reasons for this decision: first, so that there should always be a supply of lumber; second, to help keep valuable land from being washed away during heavy rains; third, to help prevent floods; and fourth, to keep the flow of the streams uniform for the use of water power.

5. For these reasons a law was passed in 1891 which gave the President the right to reserve, or set aside from sale, forest land which the government still owned. Since that time many of the best forests have been reserved, until now there are more than



The national forests of the United States are a valuable resource

175,000,000 acres of national forests. More than one fourth of all the forests in the United States are now national forests. Most of them are in the Rocky Mountain and Pacific Coast states, but there are important reserves in other parts of the country.

6. These national forests, sometimes called forest reserves, are under the care of the government Forest Service. People who work in the offices of this department in Washington and elsewhere make plans for the control of the forests. They also plan experiments with different kinds of trees. They publish information and advice about caring for woodlands and do many other things for the protection of the forests. There are other people who carry out the plans made in the offices of the Forest Service.

7. Much of the work of the Forest Service is done within the boundaries of the forests. Men called forest rangers have much of the responsibility of seeing that the national forests are well cared for and wisely used. One of their duties is to manage the sale and cutting of timber, allowing only the full-grown trees to be cut. This cutting thins the forest and makes room for the growing trees. The stumpage, or timber in standing trees, is sold to lumbermen, who come in and cut the timber which is marked by the rangers for cutting. In 1937 almost three million dollars were obtained from the timber sales.

8. If a piece of timberland has been cleared by lumbermen, or has been burned over, it is sometimes reforested; that is, it is planted again to trees. Sometimes this is done by sowing the seed directly upon the ground, but most of the thousands of acres which have been reforested have been replanted with young trees, or seedlings. During one three-year period more than five hundred million trees were set out.

9. Within the boundaries of the national forests there is much valuable pasture land which is open to settlement or which is rented to sheep and cattle owners who live near the forests. Millions of cattle, horses, goats, and sheep are pastured in the national forests. Each year more than a million dollars is collected from the men who obtain permission to pasture their stock there.

10. Forests have to be protected from many enemies. Fire is the most dangerous one. In past years many millions of acres of woodland have been en-

tirely or partly burned. Many fires are caused by lightning. From a dozen to thirty fires may be started within an hour or two by one storm. The showers of sparks shooting from the smokestack of a fast train may do fearful damage, or a campfire left by careless picnickers may be fanned by the wind and fed by the dry grass and brush of the forest until it spreads into great sheets of flame. The flames spread to the leaves, the branches crackle, the great tree trunks burn or crash to the ground. The fire sweeps on for miles, with a cloud of smoke and soot hanging over the forest. In many years the losses caused by fire in the national forests are greater than the total earnings of these forests.

11. The rangers try to prevent and check forest fires. In the summer, when the forests are dry, the chief duty of the rangers is to patrol them, watching all the time for fires. Men in high towers use telescopes to watch for smoke. As soon as a ranger sees a column of smoke which looks at all as if it might be from a fire, he sends word by telephone, messenger, or signal to the nearest "smoke-chasers," as the fire fighters are called.

12. Sometimes the fire can be put out; but usually, even when the men work very hard, the most they can do is to keep it from spreading and wait for it to die out or to be put out by rain. Fires that burn along the ground may be stopped by digging deep trenches, which hold the flames back until they die out. The usual way of stopping fires is by backfiring. To do this, the rangers start another fire at some distance

ahead of the raging forest fire. The backfire burns up all brush and dry material which could be easily caught by the main fire. When the two flames meet, they burn fiercely for a time, and then, little by little, they die out because there is no more material on which they can feed.

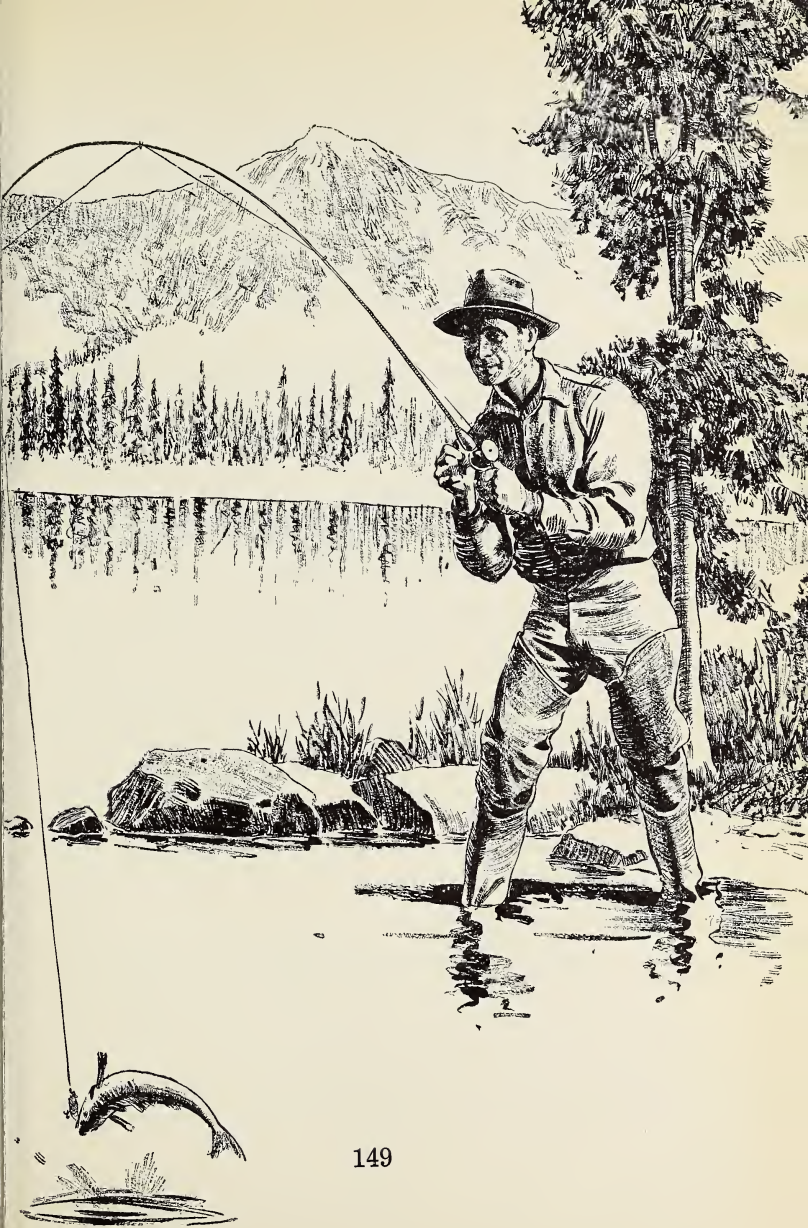
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13. During a forest fire the fire fighters are organized somewhat like an army. There is a base camp, where supplies and equipment are kept. The front-line fighters are the rangers. Behind them are the men who come to help in time of great need—logging crews who may be in the forest to cut timber, miners, ranchers, and railroad crews. Pack animals take the needed supplies from the base camp to the front line. In order to reach a fire quickly it is necessary that the national forests have roads and trails. The government sets aside a large sum every year for building more roads through the forests.

14. Of all animals, insects are by far the most dangerous enemies of the forests. They increase so rapidly that they do an enormous amount of damage. Some



of them eat the leaves and buds of trees; some destroy young plants; some suck the juice, and thus injure the leaves and bark; some eat the young roots; and some bore through the bark and into the wood, and in this way spoil the wood for lumber. The rangers watch for signs of harmful insects. They also destroy any growths on the trees which would make them decay.

15. Another duty of the rangers is to take charge of the use of the national forests for recreation. Many of the most beautiful parts of the forests are being kept by the Forest Service for recreation grounds. There are now in the national forests more than 5000 free campgrounds with fireplaces, pure water, and simple but sanitary conveniences. Many of these campgrounds are close to good places for fishing and hunting. In some of the national forests where the land is not needed for other uses, people may rent a site for a summer home. They cannot buy this land, but they may build their own cabins on it and return year after year. In 1937, nearly 33,000,000 people visited the national forests.

16. At first many persons did not think it was right to establish national forests. They thought the people of the country would get no use of them. But now most persons realize that the country as a whole gets much more use of the forests under government management, and, further, they are sure that the forests and their benefits will be made lasting for the American people.

Filling in an Outline

Fill in as many points as you can from memory. Then skim through the article again to complete the outline. *Do not write in this book.*

- I. How the forests have been wasted
 - A.
 - B.
- II. Why people wanted to protect the forests
 - A.
 - B.
 - C.
 - D.
- III. How the national forests were established
- IV. How the national forests are cared for
 - A. By the people in the government offices
 - 1.
 - 2.
 - 3.
 - B. By the rangers in the forests
 - 1.
 - 2.
 - 3.
 - 4.
 - 5.
 - 6.
- V. Why people now favor national forests
 - A.
 - B.

Using your completed outline as a guide, see how much information you recall about the national forests.

Matching Paragraph Headings

Below are sixteen paragraph headings for the sixteen paragraphs in the lesson "National Forests." But these paragraph headings are not in the right order. Read each paragraph in the lesson in order and decide which paragraph heading below is the right one for that paragraph. For instance, the first paragraph tells why forests were cut down by early settlers. Paragraph heading *g* is the right one for this. Write the answer on your paper in this way:

1. *g* -----

Now do the same for all the paragraphs. Number your paper from 1 to 16 before you begin to work.

- a.* How fires are stopped
- b.* How forests keep water from running off too rapidly
- c.* The pasture lands within the national forests
- d.* The government Forest Service
- e.* The forests' insect enemies
- f.* Lumbering in the national forests
- g.* Why forests were cut down by early settlers
- h.* The danger of forest fires
- i.* How the national forests were reserved
- j.* How the fire fighters are organized
- k.* What people now think of the national forests
- l.* Reforesting in the national forests
- m.* Use of the national forests for recreation
- n.* Wasteful methods of lumbering
- o.* Why people decided the forests must be saved
- p.* Watching for forest fires

Getting Information from a Map

A good book is not of much use to us unless we can read it. Neither is a good map of much use to us unless we can read it and understand its meaning. Reading maps is an important reading ability.

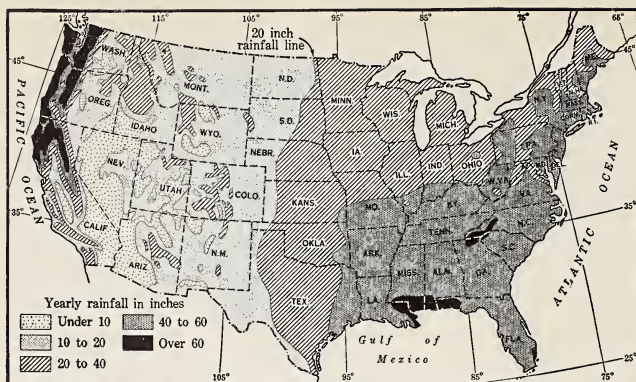
There are a number of maps in this book. Can you tell the real purpose of each one? What does the map on page 144 tell? Is the map on page 293 of the same kind? What does it tell?

At the top of page 154 is another map. We call it a rainfall map. Its purpose is to show the average yearly rainfall in the various parts of the United States. This purpose is explained by the words below the map. Such an explanation is called a legend.

What words in the legend tell what country is shown on this map? What one word tells the part of the climate of the United States that is shown? What one word tells that we are to find out from the map how much rain falls each year in different parts of the country? What one word tells us that the map does not show the rainfall for this year or for last year or for any particular year but that it tells the amount we might expect every year?

Read the legend of the map again. In your own words, explain what the map tells.

Some maps tell their story in colors. Some tell it with lines running in different directions, with dots, or in other ways. This is called shading. The map in this lesson is a shaded map. In the corner of the map each kind of shading is explained. This explanation is



Average yearly rainfall in the United States

called the key; with the key we can unlock the meaning of the map.

In the key, find the block which stands for regions where the average yearly rainfall is under 10 inches.

Do you know what 10 inches of rainfall means? Try to imagine a level field covered with water 10 inches deep. That would be all the water which that field would have during *the whole year* if its yearly rainfall was 10 inches. A region which has less than 10 inches of yearly rainfall is very dry. Sometimes it is desert. It could not be a great farming country unless some way were found to get water for the crops.

On the map find the regions which have less than 10 inches of yearly rainfall. Name the states which have such regions. Are there any states east of the Mississippi River which have less than 10 inches of yearly rainfall?

In the key, find the block that stands for regions having from 10 to 20 inches of yearly rainfall.

It is usually considered that most crops must have 20 inches of rainfall, though 10 inches is sometimes enough if it comes when it is most needed. Some varieties of wheat are grown successfully in certain of the regions which have from 10 to 20 inches of yearly rainfall.

On the map find the regions which have from 10 to 20 inches of yearly rainfall. Name the states that have such regions. How far south do the regions having 10 to 20 inches of yearly rainfall extend? How far north? Are there any eastern states which average from 10 to 20 inches of rainfall?

Using the key, locate the regions which have from 20 to 40 inches of yearly rainfall. Name the states having such regions. These include the great grain-growing states. Wheat grows well in places having from 20 to 30 inches of rain, but corn needs even more than this for a good crop.

Locate the regions having from 40 to 60 inches of rainfall yearly. In what parts of the country are they? How are they shown? Name all the states in which there are areas having from 40 to 60 inches of rainfall every year. In these regions having from 40 to 60 inches of rainfall are some very fertile farm lands. Can you name some of their products?

In which states are there regions having 60 or more inches of rainfall? You will notice that three of these are western states. The winds of this region blow from the west across the Pacific Ocean, and they gather up a

great amount of water vapor in their travels. As they rise in order to pass eastward over the mountains the air cools, and much of the vapor is turned into rain or snow which falls on the ocean side of these mountains. Notice that much of the region having less than 10 inches of rainfall is east of this region of very heavy rainfall. Can you now give one explanation for the lack of rainfall east of the mountains?

How Well Can You Read the Map?

1. What is the average yearly rainfall where you live?
2. What is the average yearly rainfall around the Great Lakes?
3. What is the rainfall of eastern Colorado?
4. Which states have both very wet and very dry regions?
5. Why should you expect the crops in eastern Texas to be different from those in the western part of the state?
6. Should you expect the states of the western plains to raise much corn?
7. What is the average rainfall in Minnesota?
8. Which sentence is right?
 - a. Most of the south central states have more rainfall than the north central states.
 - b. The New England states have less rainfall than those of the southwest.
9. Which have the more rainfall, the eastern coast states or the north central states?
10. Which has the more rainfall, New Orleans or Minneapolis?

A Hobby for Everyone

To most boys and girls there comes a time when they want to collect something, to get together their own special, private set of things that match or are alike in some ways and yet are different enough to be interesting. They may find and treasure a certain kind of stones, or shells, or tiny toy animals, or pictures. There are dozens of things that make up those first collections.

They are lucky boys and girls who begin at this time to collect stamps. All their lives they will look at stamps with more interest because of the knowledge they have gained about them. Nor will they be alone in their interest. In every community they will find other boys and girls, and older people too, who are doing the same thing. They will keep hearing and reading of famous people, kings and queens, presidents, businessmen, doctors, explorers, and authors, who have this hobby. What is there about stamp collecting that makes it so interesting?



Stamps are so familiar to us that we forget that there was a time, not so very long ago, when there were no postage stamps. Letters of the 1830's and 1840's did not have these little pieces of government paper pasted on them. Instead, a mark was stamped on them giving the amount of postage due. When a letter was brought to the post office of a hundred years ago, the postmaster had to figure out the cost of mailing according to the size of the letter and the distance it was to be carried. Perhaps the postage was paid at that time; but as often as not the figures stamped on it were to show what should be collected when it was delivered. A good many people felt that a letter was likely to arrive more promptly if the postman was going to get some money when he delivered it.

The first stamp collection could not have begun until the year 1840, when Great Britain printed its first postage stamp with a picture of Queen Victoria on it. That started the custom, which has been continued ever since, of having the heads of rulers or of other famous people pictured on stamps. That early collection, if there had been one, would soon have had two United States stamps, one with the picture of Benjamin Franklin, and the other with that of George Washington.

Here we have suggestions for kinds of stamp collections that we might choose to make. Watch for the





pictures of Presidents of the United States on stamps. You will find that you can make, in time, a fairly complete collection. While you are waiting to fill in some of the empty spaces in your list, collect stamps with pictures of the leaders of other countries.

Another interest, suggested by the Franklin stamp, is a history of the United States mail, as it is told in postage stamps. In this collection, if it were complete (which no collection ever is!), there would be a stamp of the year 1869 picturing a rider on his horse, traveling at full speed. This stamp recalls the time when mail was carried by the pony express, each rider covering from seventy-five to one hundred miles across the plains and mountains of the Middle West and the Far West. Such a collection would wind up with the latest stamp showing an airplane carrying mail. Indeed, one of the newest and most interesting collections that boys and girls are making is of air-mail stamps. One of the early ones shows a map of the United States with two airplanes flying across it. This stamp was used in 1926 on the first air-mail route across the country. A Lindbergh stamp followed in 1927.

Another collection might be of stamps with pictures of ships on them. In it there would be a whole series of Columbus's ships that was issued during the celebration of the four-hundredth anniversary of the landing of Columbus on American shores. It would show the honor given by different countries to many explor-

ers, and it would also give a history of ships, from sailing vessels to steamboats.

Every stamp has a story behind it. It is the business, and pleasure, of the stamp collector to find out that story. Part of it is easy to read on the face of the stamp. For the rest of the story there must sometimes be a careful search for information.

Many of the stamps with which we shall fill our albums, or stamp books, come from foreign countries. That is part of the fun of stamp collecting. But we shall soon find that we do not know as much about the geography of the world as we thought we did. Even among stamps issued within a few years there are names of kingdoms, provinces, and other small sections of the earth's surface for which we have to hunt on the map and in our stamp album to see where the stamps shall be placed. History is written more rapidly in stamps than in books, for one of the first things a new nation is sure to do is to issue a new stamp with its name printed on it. After the World War many changes were made in the countries of Europe. Before the geography and history books could be rewritten and reprinted and sent out to libraries and schools, the names of the new countries were becoming familiar to the boys and girls who were pasting the new stamps into their albums.



Why do governments issue new stamps? It costs money to have new designs chosen and made, and to have new stamps printed. Yet, every little while, when you go to the post office to buy a two-cent or a three-cent stamp, you may be handed one with a design that is different from the one you have been getting, or printed in a new shade. Governments issue new stamps to call attention to certain persons, events, industries, or inventions. The tiny new pictures about these subjects which are printed on postage stamps will be bought and sent far and wide. Stamps go everywhere, all over the country where they are issued, and to other countries.

Governments take pride, too, in the beauty of their stamps. Many stamps have been printed in honor of the one-hundredth or two-hundredth or three-hundredth anniversaries of important happenings. If you collect some of these stamps, which are called "commemoratives" (because they commemorate, or call to memory, something in the past), you can have a very fine collection.

Because stamps are made to represent in some way the special things about the country from which they come, there are all sorts of odd and interesting stamps that are not too difficult to obtain. One of the best kinds of collections for a beginner is a collection of animal stamps, for many countries use some native animal



as a sign or symbol. There are said to be more than three hundred issues with four-footed animals or birds pictured on them. You may have a stag from New Caledonia, a llama from Peru, a kangaroo from Australia, a hippopotamus from Liberia, a tiger from Malaya, a crocodile from North Borneo, a condor from Bolivia, and a dove from Japan—all looking out from the pages of your stamp book. Many camels can be found, as these animals are used in transportation in many countries and are so pictured on the stamps. Elephants often appear, from both Africa and Asia. An animal collection can be started by the purchase of an inexpensive envelope of stamps from a dealer. Then you may add to it by exchanging stamps with other collectors.

You need not know much about stamps in order to start your collection. When you begin to collect, you will gather in any and all stamps that you can lay your hands on. Then you will begin to find out about stamps, probably from a stamp album. Such a book will teach you more about the different kinds of stamps and their values than any number of stories or articles on the subject. Here are pictured or described, usually with price suggestions, the stamps you may want to buy. When stamps of the United States are shown they are



either undersize or oversize, as it is against the law to print a photograph of a stamp exactly the same as the real one. That is to keep dishonest people from printing and using pieces of paper that look like the real stamps but are not.

A beginner will gather in what stamps he can find and will sort them out by countries or kinds as best he can. He will find it a good plan to keep them in separate envelopes, each marked with a description of the kind it contains. But before he has gone far, he will want to mount them. Then one of these printed albums is a worth-while purchase, for it will serve as his guide in collecting, as well as being a holder for the collection. He may match his stamps to the pictures and descriptions given in the album, and he will begin to see which stamps he needs to fill in any special set he is trying to get.

Before he puts any stamp in this album, or in a notebook which he may begin to keep until he has gathered a good many, he must learn how to put them in, or mount them. He should not put glue on them, nor stick them to the paper as he would a newly bought stamp for a letter he wished to mail. Certainly not! Stamps for a collection should be mounted on little thin paper hinges that come by the hundred in inex-



pensive packages. So mounted they are safely held in place, but can be moved or straightened or examined without being harmed.

We have been talking as if the pictures were the only things we need to notice on stamps, but that is only a part of the story they have to tell. Your collection will be made up chiefly not of new, unused stamps, such as are bought at the post office, but of used stamps, those which have gone through the mail and have had something printed on them to show that they have been used and cannot be used again. Such marking is known in stamp language as canceling. As you watch stamps that come on mail, you will find that there are different ways of canceling, with different lines or bars or words printed across them according to the place and time of mailing or for other reasons.

Some stamps are not printed on separate pieces of paper, but instead are printed on the envelopes themselves. Some day you may come across a person who says he is collecting "covers"—by which you find he means that he is collecting the entire envelope, or the upper right-hand part of it—not simply the stamp. This gives him the postmark and the date the letter was sent. Some envelopes that you see will not have any stamps, but will carry a government "permit" for mailing printed on them in the place where one would expect the stamp. This is to save the trouble of pasting on stamps when many letters are mailed.

We have been talking as if postage stamps were the only stamps there were. But what about the tax stamp that was one of the causes of the American Revolution?

That was a revenue stamp, sign of a tax that must be paid. We have a great many of those today, and some people collect them. And Red Cross stamps? Some boys and girls make collections of those.

This all goes to show that stamps are a part of real life, a kind of picture story of what is going on in the world. So if you start a collection, you will be beginning your own picture story of some part of this great pageant. If you do not start one just now, at least you will look with more interest at the stamps that come your way.

Marion F. Lansing

Classifying Information

1. Did you know that so many different kinds of postage-stamp collections could be made? List all the kinds suggested in this lesson. Perhaps you have another kind of collection yourself, or know someone who has. Draw a line across your paper and add any other kinds of postage-stamp collections about which you know.

2. How might you make a stamp collection? Skim through the lesson and find all the suggestions you can. List these suggestions. Then go back and number them according to the order in which a new stamp collector might follow them.

3. Were you surprised to learn that stamp collections sometimes include other things than postage stamps? What other kinds of stamp collections are there?

4. Make a list of the things that you might learn from a stamp collection.

Putting Ideas in a Nutshell

Have you ever heard anyone speak of putting ideas in a nutshell? Do you know what is meant by this saying?

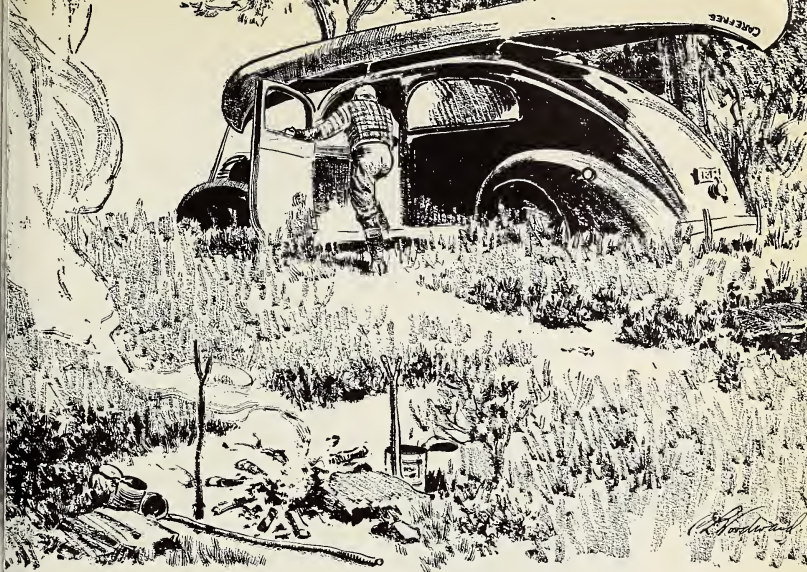
Sometimes people want to tell their ideas in the fewest words possible. They also want their ideas to be clear. When ideas are expressed briefly and clearly, we say that they are put in a nutshell. Making a summary is one way of putting ideas in a nutshell.

In giving talks in class, in listing points for review, or in making clear recitations, you often need a good summary. You can tell a good summary because it does three things: first, it makes the main idea clear; second, it tells only important points; and third, it wastes no words.

For the paragraph below, three summary sentences are given. After the three summary sentences you will find the reasons why one of these sentences is better than the others.

People who go on holidays often feel such freedom that they take reckless chances. They gather together a few sticks for a fire, boil their coffee or fry their fish over the blaze, and then forget about the fire. It will go out, they think, when perhaps it may smolder for hours until a gust of wind fans it again into flame and it begins to spread over the surrounding country. Forest fires are often caused in this way.

Now read the summary sentences on the next page.



1. Picnickers often cause forest fires.
2. Picnickers often build fires with sticks, boil their coffee, fry their fish, and then go off, leaving their fires to smolder into a blaze.
3. Picnickers often cause forest fires by leaving smoldering fires which the wind fans into flames.

The first summary sentence is not good. It tells the main idea, but it leaves out important facts.

Read the second one again. This is not a good summary sentence because it does not tell the real point. It tells unimportant facts.

Read the third sentence. This is the best one because it gives the main idea, it tells the important points, and yet it does not have unnecessary words.



For each of the following paragraphs, three summary sentences are given. Read each paragraph carefully and decide which sentence is the best summary.

I. Many people believe that small fires among leaves or underbrush are harmless; that, in fact, it is good to "clear" the woods in this way. Yet such fires are very harmful. They wound the larger trees and destroy the young growth and seedlings from which the next forest must come. Also, they rob the forest of nature's sponge for holding moisture and her fertilizer for feeding the trees by burning up the decayed plants and leaves. No forest fire is harmless, no matter how small. Then, too, there is always the danger that a small fire may spread and get beyond control.

SUMMARY SENTENCES

1. Many people think small fires are good because they clear the woods; but they are harmful because they wound the larger trees and destroy the young growth and seedlings from which the next forest must come.

2. Small fires are harmful because they wound the larger trees, destroy the young growth and seedlings, rob the forest of its moisture and fertilizer for the trees, and sometimes get beyond control.

3. Even small forest fires are harmful.

Which is the best summary sentence. Why? Why is neither of the other two so good?

II. Only strong men of great endurance are good fire fighters; no boys so young that they have not got their full strength; no men so old that they have lost theirs. At the very least these men will have to work twelve hours a day, cutting down trees, digging fire lines in the earth, cutting out the underbrush, sometimes in dangerous places where the air is like the heat of a furnace and thick with smoke. There will be no bath. They will sleep on thin beds made on the ground. At any moment the gang that is sleeping may be roused and sent to the lines again. It is a question of just how long human strength can hold out, for a fire fighter must stand up to a fire and keep fighting even when he is blistering with heat and choking with smoke.

SUMMARY SENTENCES

1. Fire fighters must be able to do hard work for long hours under the most difficult conditions, and keep on fighting the fire in the midst of danger and suffering.

2. Fire fighting is difficult because there is no chance to keep clean, because the men are wakened to go back to work, and because they must work long hours.

3. Because fire fighting is hard work, strong men are needed for it.

Which is the best summary sentence? Why? Why is neither of the other two so good?

What three things does a good summary sentence do?

An Island City

I. A FAMOUS CAPITAL

Imagine an island city having more than a fourth of a million people; a lake with floating gardens; canals busy with boats; red-stone palaces with fountains playing in the courtyards; a zoo filled with rare birds, wild animals, and strange reptiles; a huge market where thousands of people buy flowers, fruits, tools, medicine, fine clothing, toys, books, paintings, and jewelry. What city do these things describe? When was it like this? What kind of people lived in it?

The city was Tenochtitlan (*tā nōch'tē tlān'*), the capital of the great Aztec empire, as it was when the Spaniards discovered it in the year 1519. White people always have called it the city of Mexico. It was the home of one kind of American Indians, the Aztecs. But how different these Indians were from those you usually read about in your storybooks or see in the movies!

For some reason, most people have come to think of the Indian of the North American plains when they use the word *Indian*. Stories are told of his warlike spirit, his attacks upon wagon trains, and his methods of hunting the buffalo. We think of his home, the tepee, as the kind that most Indians had; yet only a small part of the Indians in North America lived on the plains or in tepees. The Indians of New York, for example, lived in villages in bark houses. Many Indians were much more civilized than either the Indians of the plains or those of the eastern part of what is now the United States. Among the most civilized Indians of North

America were the Indians of Mexico. It was these Indians who built the city of Tenochtitlan.

Tenochtitlan was captured and destroyed by the Spanish under their leader, Cortes, in 1521. The new city of Mexico was built on the same spot. How do we know, then, what the old city of Tenochtitlan was like and how the people lived?

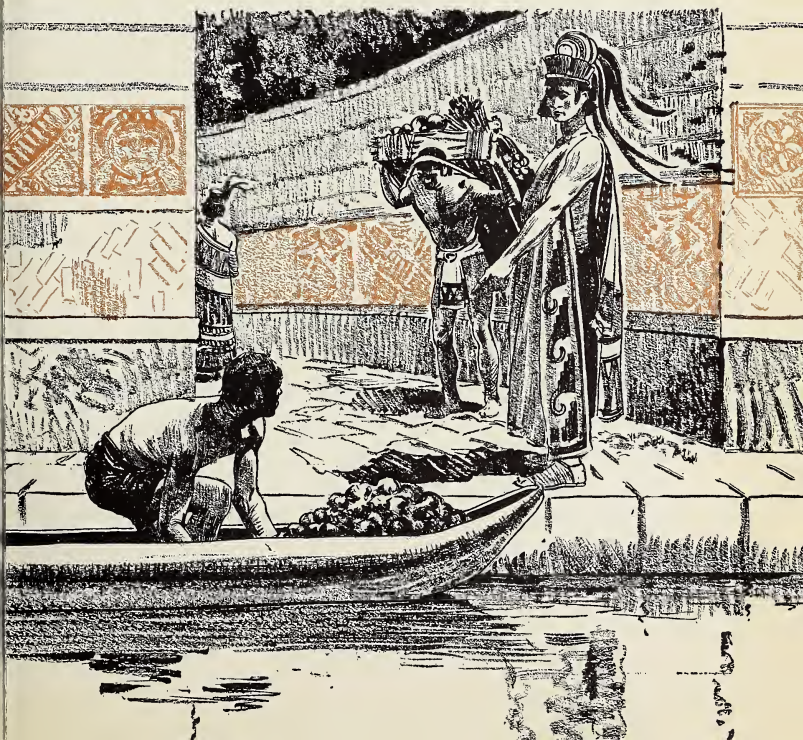
Our knowledge of the Aztec city of Mexico and of the Indians who lived in it has come from four sources. First, the Spaniards who visited this great city, and later conquered it, wrote many stories of their adventures. They described the rich and wonderful gifts



given them by the Aztec ruler, Montezuma. They told of the great beauty of the city. They described the manner in which the Aztecs lived.

Second, although the Aztecs had no alphabet in which to write their language, they wrote a kind of picture writing in books made of paper or deerskin. Forty of these books have been saved and can be seen today. Most of them have been translated into modern languages.

Third, soon after the Spaniards conquered the great Aztec city, they taught some of the Indians to write the Aztec language using the Spanish alphabet. These



natives wrote about their own people and about the city as it was before the coming of the white men.

Fourth, men have been able to learn much about the Aztecs and the city of Tenochtitlan from parts of old buildings and pieces of old pottery and statues that have been dug up in and about the city of Mexico.

By piecing together facts brought to us from these four sources, we are able to know much about the Aztecs and about their great city.

The city was built in the large, shallow lake of Texcoco (tās kō'kō), which lay in the fertile valley of Mexico. All about the city stretched the valley, like a great garden. Groves of trees and fields of maize grew there.

The city itself was built in a most unusual way. The center of the city, with its temples and palaces, was built upon a lovely island. Since this island was far too small for the houses of all the people, the Aztecs made small floating islands on the shallow lake. They wove rafts of reeds and piled mud upon them. Some of these handmade islands were large enough for a small house and for a garden as well. Sometimes the roots of the plants on the floating islands grew down into the bottom of the lake and anchored the rafts. Some of the smaller islands could be pushed around with a pole whenever the owner wanted to change the location of his home. Thousands of these tiny islands made up the outer part of the city.

Three wide streets, or causeways, led from the mainland out to the city in the lake. They were several miles long and wide enough for ten Spanish horsemen

to ride side by side. The causeways were made of huge stones well laid in cement. At certain places along the causeways and at the entrances to the city were drawbridges. These drawbridges could be raised to allow boats and canoes to pass through and, in times of danger, they could be raised so that enemies could not get into the city.

Beside the causeways floated small islands covered with growing plants that almost hid the tiny thatch-roofed huts upon them. Canoes loaded with fruits, vegetables, and maize glided over the lake and among these islands.

Although the city was wonderful to see from a distance, it was still more wonderful to see within the twelve-foot wall of solid stone that protected the inner part of the city.

Most of the streets of Tenochtitlan were narrow. Since the Aztecs had no horses or other domestic animals to haul their loads, there was no great need for wide streets. There were many canals throughout the city, however, and boats served to carry goods from place to place. The city reminded the Spaniards of Venice, the lovely Italian city of canals, boats, and bridges.

The main streets of the city, however, were wide and beautiful, and some of them ran from one end of the city to the other. They were paved with smooth, hard cement. A thousand persons are said to have worked at washing and sweeping them clean. One Spaniard said that a man "could walk through them with as little danger of soiling his feet as his hands."

On these main streets stood the homes of the nobles and the rich. Their houses were built of red stone, and



each one spread over a large space of ground. Few were more than one story high. Each house was built around a square, with a courtyard in the center where fountains of water shed their coolness. The walls facing the courtyards were decorated with stones of many colors from the neighboring country. The flat roofs of the fine houses often had roof gardens filled with bright-colored flowers. Between these red-stone houses were gardens of unusual beauty.

The houses of the common people were built of sun-dried bricks upon foundations of stone. The very poor people lived in huts made by weaving together reeds and covering them with mud. The roofs were thatched. Out upon the shallow lake, huts were sometimes built upon poles over the water.

Water was brought through earthen pipes from a mountain near the city. There were two of these pipes, so that if one became broken, water could be obtained through the other. Such pipes for carrying water to a large city are called aqueducts. At certain places in these aqueducts there were openings where people in canoes could get water, which was carried to the common people in all parts of the city. The rich people had water piped directly to their houses.

How Well Did You Understand What You Read?

1. Although the city of Tenochtitlan was destroyed in 1521, men have learned much about it and about the people who built it and lived there. List four sources of our knowledge about Tenochtitlan.

2. Suppose you wanted to prove that the Aztecs were more highly civilized than other North American Indians. One good way to do this would be to tell about their famous city. Read the following topics. Then skim quickly through the lesson and, for each topic, find at least one point that proves that the Aztecs had developed a greater civilization than most other North American Indians.

- a. Means of protecting the city from its enemies
- b. The main streets of the city
- c. Transportation of goods within the city
- d. The homes of the Aztecs

3. The map on page 176 will help you to answer these questions:

- a. How many causeways led to Tenochtitlan?
- b. Was there a town at the entrance to each causeway?

II. LIFE IN TENOCHTITLAN

A. HOW THE AZTECS DRESSED

Nothing about the city of Tenochtitlan was more colorful or more unusual than the clothing of the people. Men wore cloaks thrown over their shoulders and tied round their necks. The cloaks of the poor were made of the fiber of plants or of coarse cotton. The cloaks of the rich were sometimes made of fine cotton richly embroidered. For

cooler weather, the rich men wore cloaks made of fur or the gorgeous and delicate featherwork for which

the Aztecs were famous. The Aztecs also made a very fine, soft material by spinning and weaving the hair of the rabbit. These fine cloths were dyed beautiful gay colors and were made into clothing for the rich nobles.

The women wore several skirts of different lengths. These were richly decorated at the hems. The dresses of the rich were especially fine and delicate. The straight black hair of the women floated over their shoulders.



B. THE MARKET

The most lively place in the city of Tenochtitlan was the market. In this great square, traders from all parts of the kingdom were busy selling their goods.

Markets were held every five days, or once a week, for there were five days in the Aztec week. Great crowds of people, at least 40,000 of them, came to market on market day. In fact, all people who lived within ten miles of the market were expected to come to the city on market days. Most of the marketing was done by the women, who came both for pleasure and for business. They met their friends, heard the news, and gossiped, just as women did at the market places in other parts of the world.

The market place was divided into sections. Different kinds of goods were sold in each section. At one place piles of cotton might be seen, and at another place dresses, curtains, or other cotton goods.

There was one place where the goldsmiths sold lovely trinkets and curious toys made of gold and silver. These toys were made to look like birds and fishes, with feathers and scales of both gold and silver, and with movable heads and bodies. The goldsmiths' trinkets and toys often were decorated with sparkling jewels.



In other parts of the busy market were sellers of pottery, carvers of wood with their vases, and painters of paint-and-feather pictures.

There were merchants who sold things useful to soldiers—helmets, quilted armor, and feather top-



coats. They sold weapons of the sort used by the Aztec warriors—copper-headed spears, arrows, and swords with sharp stone edges.

In the market place there were booths where the thin-bearded Aztecs might be shaved by native barbers. There were also public baths and booths for washing one's hair.

Drugs, roots, and healing herbs were sold by drug merchants. Blank books for picture writing were to be seen, folded together like big fans.

Animals, poultry, fish, fruits, and vegetables were for sale in the market. Even cooked foods were to be had. Foaming chocolate, delicately flavored with vanilla, was a special treat to the marketers.

Throughout the market place, not only the many florists' shops but every booth was overflowing with flowers. Because of the rich soil and mild climate, flowers grew and bloomed as easily in Mexico as weeds did in most parts of the world.

C. AZTEC SCHOOLS

The Aztecs had schools both for their sons and for their daughters. The training given in the Aztec schools was very much more strict than that which is given in most schools today.

There were two kinds of schools for Aztec boys. One was for the sons of the common people, and the other was for the sons of the nobles.

The sons of the common people were sent to schools near their own homes when they were about six years old. The boys lived at the schools, which were

connected with the village temples. Priests were in charge of these schools.

Boys were taught religion, for religion was the most important thing in the lives of the Aztecs. They also were taught history and art. Dancing was very carefully taught, for dancing was an Aztec form of worship. Aztecs danced to please their gods.

Besides getting an education, these schoolboys had certain duties to carry out. They swept the temples. They cared for the incense pots and for the temple fires. They chopped wood and drew water for the temples. They hunted for roots and herbs from which they made paint that the priests used to decorate their bodies for certain religious ceremonies. They beat upon drums to call the people to the temples.

The sons of the nobles went to the school connected with the temple in the city of Tenochtitlan. This school was much more strict than the schools for the sons of the common people. The priest who ran it was a very important man in the city. The boys were taught to be priests and warriors. During the six or eight years they attended the school, they lived there and seldom saw their parents.

Aztec girls went to schools run very much like those for boys. Their teachers were priestesses. Girls started to school when they were about five years old. They learned to spin and weave, to cook, and to be good wives. Besides learning their household lessons, the girls served in the temples very much as the boys did. The schools were very strict. A girl never could leave the school without an old woman to go with her. If

a girl should disobey, she was beaten with nettles, or the soles of her feet were pricked with thorns. Even the daughters of the rulers were treated in this way.

D. THE ROYAL PALACE

Nothing about the city of Tenochtitlan interested the Spaniards more than Montezuma's palace and the many interesting sights connected with it.

It was Montezuma's zoo that surprised the white visitors most. Every kind of wild animal and strange reptile known in Mexico was kept there. None of these animals were exactly like any ever seen in Europe. Certain animals, like the American buffalo, had never before been seen by white men. Especially unusual were the snakes "with bells on their tails" (that is, the rattlesnakes), for there were none in Europe.

Near the zoo was a great aviary, a place for keeping birds. Birds from all over the Aztec kingdom and even beyond were kept in Montezuma's aviary near the palace. There were scarlet cardinals, golden pheasants, parrots of every size and color, and tiny, glistening hummingbirds. These birds were kept for their beautiful feathers, which were used to make the unusual Aztec featherwork. So many birds were kept that three hundred people were needed to care for them.

While the white visitors were astonished by the aviary and zoo, they were also surprised by the splendor of Montezuma's life within his red-stone palace.

The royal food was of the finest. Fish was often served which only the day before had been caught in the Gulf of Mexico two hundred miles away. It was





sent to the palace by relays of fast runners. Sweetmeats and pastry made of maize flour delighted Montezuma and the nobles of his court. Many pitchers of chocolate were drunk in the royal household each day.

E. SOURCES OF AZTEC RICHES

What made the city of Tenochtitlan so great? Where did the riches of the Aztec empire come from? Where did Montezuma get his stores of gold, his granaries of maize, and his other riches?

Tenochtitlan was the center of a great Indian kingdom. The Aztecs were a warlike people who had conquered many other tribes throughout the part of North America in which they lived. From all the lands which belonged to the empire and from other tribes that hoped to escape conquest by paying tribute, they collected taxes. Everyone was forced to pay taxes in whatever he raised or produced. Taxgatherers were sent throughout the empire to collect the taxes for their ruler. Persons who would not or could not pay their taxes were sold as slaves.

One great source of taxes was salt. It was manufactured from the salty waters of Lake Texcoco near the great city. This was an important industry, because salt was not found in many places and was highly prized by the Aztecs. People all over the Aztec empire got salt from the Texcoco salt beds. A certain part of all the salt was taken for taxes.

Lists of some of the things paid in for taxes by certain cities show the many different things that Montezuma received. Among these were twenty

chests of ground chocolate, five pieces of armor covered with rich feathers, sixty pieces of armor covered with common feathers, four chests of maize, eight thousand reams of paper, two thousand loaves of fine white salt for the use of the nobles, one hundred copper axes, four thousand loads of lime, tiles of pure gold, twenty bags of fine gold dust, eight thousand handfuls of rich scarlet feathers, one thousand six hundred bundles of cotton, and forty bags of cochineal, which is a fine red dye.

With such riches pouring into the city, it is easy to see that Tenochtitlan could be made very beautiful. So beautiful, indeed, was the great Aztec city that, when the Spaniards first came upon it, one of them asked in surprise, "Are not these things a dream?"

Kathryn Smith

Can You Ask Questions about the Main Ideas in the Lesson?

Part II is divided into sections with a heading for each section. Section A tells how the Aztec people dressed. Read this section again and select the main ideas. Then write a question asking about each main idea. For example, for the first section you might write

A. How the Aztecs Dressed

1. What kind of clothing did Aztec men wear?
2. What kind of clothing did Aztec women wear?

In the same way, write questions about the main ideas given under each of the other sections of Part II.

A Valuable Mineral

If you were asked to name the minerals that men have valued most since the world began, what would you answer? As you read this lesson, see whether or not you want to change your answer. Try to decide also what makes a mineral valuable.

Salt is now so common and so cheap in most parts of the world that it is hard to realize how precious it used to be and how important it is today. In early times people hunted for new homes, built ships, entered into trade, and even made war in order to get salt for their food. Salt is even more important to us today, for we use it not only as a food but also in many other ways. Nearly half the salt produced in the United States is sold in the form of natural or artificial brines to be used in chemical industries.

All animals need salt. Meat-eating animals such as cats and dogs get the salt they need in the flesh and blood of the other animals they eat. They do not seek additional salt. In fact, cats and dogs usually show a distaste for salted food. On the other hand, animals such as deer, cattle, and horses, that live on vegetable food, usually need salt in addition to that which they get in their food. Farmers put loose salt or blocks of salt in the pastures for their cattle and horses. Most deer pay regular visits to salt springs and salt licks in order to get salt.

Salt is also an important food for man. Some tribes of hunters and fishermen who live almost wholly upon

animal food do not add salt to their diet. They get enough salt in the meat and fish that they eat. On the other hand, people who live chiefly on vegetable diets may need to add salt to their food.

Although some salt is necessary for good health, doctors tell us that many people eat more salt than is really good for them. A good rule is to add a little less salt to your food than you like. The amount of salt that a person needs, however, is not always the same. People need more salt when they perspire freely. This is because salt is needed to replace the salt lost from the body through perspiration. Salt is often taken by people during the summer to keep them from suffering from heat and from having heat strokes. In some industries, salt tablets are placed near the drinking fountains for employees. Salt is sometimes added to the drinking water of workers in steel plants who work near the great furnaces.

Salt is now used for many things other than food seasoning. It is used in refrigeration, in water-softening plants, and in preparing gold and other metals for use. Salt is used in glazing pottery, in making enamelware, and in the manufacture of cement. It is used in making many chemicals. It helps to preserve hides in the manufacture of leather. It plays an important part in the steel industry. It is employed in the manufacture of textiles. It is used in packing houses for preserving and curing meats. Large amounts of salt are used in preserving fish. It is used in the making of paper, dyes, and sugar. It is also very important in the manufacture of soap.

Today great use is made of salt in hospitals. Persons recover much more quickly from certain operations if salt water is put into their veins.

In places that lack salt and which have no good roads or other means of bringing it in, this mineral is greatly prized. There are places in Africa where no salt is to be found. The natives of the jungle who are lucky enough to get a lump of rock salt in trade from an

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explorer or from a hunter suck it as American children suck lollipops. Salt cakes have been used for money in parts of Africa. Once, in the sun-baked market places there, slaves were sold for a handful of impure, reddish salt.

Today there are four principal sources of the world's salt supply. One important source is the sea. Sea water is allowed to stand in pools until it has been evaporated by the sun's rays, leaving the impure crystals of salt. This is the oldest of all methods of producing salt from the sea. It was used in Biblical times by people living along the edge of the Dead Sea in Palestine. It was used thousands of years ago by the Chinese. This oldest method of producing salt is still in use. On San Francisco Bay, in California, there are today fifteen thousand acres of salt-harvesting fields and ponds where salt is made from sea water. Sea water is also evaporated by artificial means. After the water has been evaporated, either by the sun's rays or by artificial means, the salt is taken to a salt refinery where dirt and other impurities are removed. The sea is an inexhaustible source of salt. A scientist has estimated that if all the salt were taken from the sea it would make a mass more than fourteen times as great as the continent of Europe.

In some parts of the world, salt is secured from natural brines that lie beneath the earth's surface. These brines are pumped to the surface of the earth, and the water is evaporated to produce salt. Natural brines are also found in salt lakes. You will recall that the Aztecs got salt from the water of Lake Texcoco.

Much of our salt is produced from artificial brines. Wells are drilled into salt beds lying beneath the earth's surface. Fresh water is pumped into these wells and allowed to remain in the salt beds until the salt has dissolved in it. The salty water is then forced to the surface, where the water is evaporated, leaving the crystallized salt.

Much of the world's salt is rock salt produced from mines. This rock salt is mined in much the same way as coal and iron. In some parts of the United States, rock salt is mined that is so free from impurities that it has only to be ground up before being used.

The United States has great resources of rock salt. It is said that Louisiana and Texas alone contain enough salt to last the whole world more than four thousand years.

One of the world's most famous salt deposits is near the city of Cracow in Europe. The mines there have been worked for several hundred years and at one time furnished much of the income of the Polish kings. In some places the mines are nine hundred eighty feet deep. They extend below the surface of the ground almost as far as the Chrysler Building in New York extends above it.

Salt is produced in many parts of the world. Among the most important salt-producing countries of the world are the United States, Great Britain, China, Germany, and France. The United States produces about one fourth of the world's supply. Among the leading salt-producing states are Michigan, New York, Ohio, Louisiana, Kansas, California, and Texas.



Finding Proof for a Statement

People often need to locate quickly a sentence or phrase that proves whether or not a statement is correct. In school you may want to find which of two answers reported in class is correct. This exercise will give you practice in finding statements that prove the accuracy of a point.

As quickly as you can, skim the lesson to locate the sentence or phrase that tells whether each statement below is true or false. Number your paper from 1 to 10. After the number of each statement write *True* if the statement is true, and *False* if it is false. Then copy the words that tell whether the statement is true or false. Below you will see the proof for the first statement. Now complete the exercise.

1. *True.* " . . . doctors tell us that many people eat more salt than is really good for them."

1. It is possible to have too much salt in your diet.
2. Salt is not so important as it used to be.
3. Salt is used only as a seasoning for food.
4. Salt has been used for money.
5. Some salt is obtained by evaporating water from the sea.
6. People should be careful to eat very little salt during the summertime.
7. Salt is used in hospitals.
8. You should eat all the salt you want.
9. Salt is used to keep certain foods from spoiling.
10. About one fourth of the world's production of salt comes from the United States.

Filling in an Outline

The main topics of the lesson are the main headings of the following outline. Organize the information about salt by filling in the outline. You may refer to your book when necessary.

Copy the main headings on your paper. Then write in the subheadings in as few words as possible. The first two subheadings are given for you. *Do not write in this book.*

- I. The value of salt
 - A. In early times
 - B. Today
- II. The salt needs of animals
 - A.
 - B.
- III. The salt needs of men
 - A.
 - B.
- IV. Amount of salt necessary for good health
 - A.
 - B.
 - C.
- V. Uses of salt other than for food seasoning
 - A.
 - B.
 - C.
 - D.
 - E.
 - F.
 - G.
 - H.

- I.
- J.
- K.
- L.
- M.
- N.
- O.
- P.
- Q.

VI. How salt is prized where it is scarce

- A.
- B.

VII. Sources of the world's salt supply

- A.
- B.
- C.
- D.

VIII. Where salt is produced

A. Countries that produce the most salt

- 1.
- 2.
- 3.
- 4.
- 5.

B. States in the United States that produce the most salt

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

A Visit to a Salt Mine

In this lesson you will make an imaginary visit to a Louisiana salt mine. On your visit look for the answers to these questions:

1. What does the mine look like?
 2. Is the air comfortable so far beneath the earth's surface?
 3. How is the salt mined?
-

A visit to a salt mine fills us with admiration and wonder and even with a little fear. To go down to the mine, we get into a little bucketlike elevator called a skip. After a sudden jerk, the skip is lowered. Down, down we go. All light disappears, and we are in the midst of the darkest darkness we have ever known—the black night of the inside of the earth. On all sides of the skip are walls of salt that seem to have no end.

All of a sudden we become deaf, and we must hold our noses to get back our hearing. After a few minutes light from the mine below begins to appear in the shaft, and soon we step out into what seems to be an entirely different world.

It is pleasant down here, hundreds of feet beneath the surface of the earth. The temperature all the year round is about 75 or 80 degrees; and the air is dry, for the solid salt walls absorb most of the moisture. We wonder how fresh air is supplied, and, as we look up, we have our answer. Large tubes, curving and coiling all through the mine, carry away the impure air and supply fresh air, drawn from the surface for the busy miners.

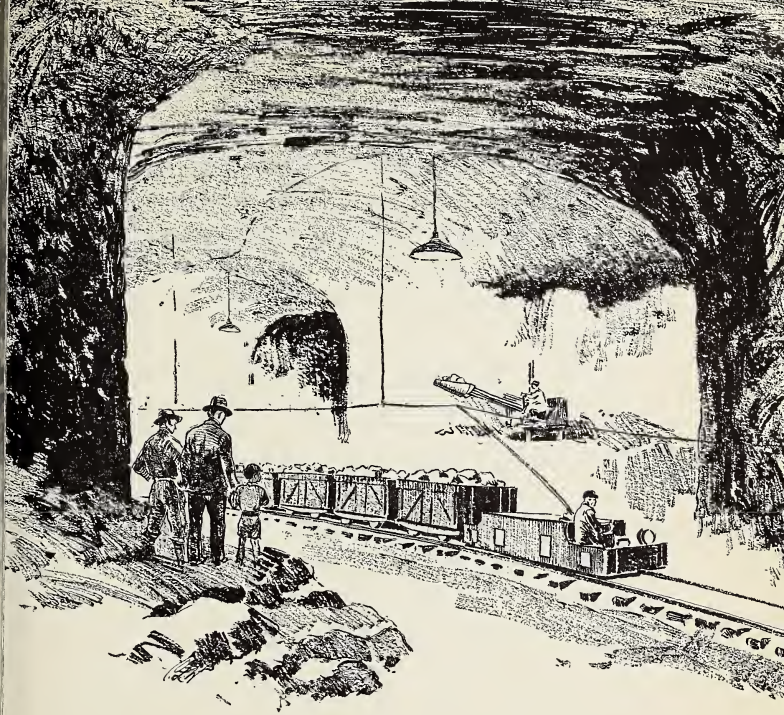
The mine has a strange appearance that almost frightens us. It seems like a still, deserted city with a top on it. We walk along the huge corridors that are as wide as streets, through air made hazy by the dust of dynamiting and shoveling. We notice the absence of any sounds except those of the mining processes. We miss the honk of automobile horns, the clatter of footsteps, the noise of streetcars, and the cries of newsboys. This is indeed a silent city! Even the miners whom we meet only glance at us as they go their silent way.

It is hard to realize that this huge cavern is all salt, that we are walking on salt, with salt all around and above us. The walls of the mine look like marble or granite, but they are really solid rock-salt crystals that sparkle like diamonds when lumps are broken apart.

The passageways, or streets, are located about 75 feet apart. As much salt is left between these streets as is taken out in making them. This provides solid pillars for the support of the salt roof, 70 feet above, and thereby prevents cave-ins.

Electricity seems to be more important in our underground city than even the miners themselves. Electric lights are everywhere. The little trains that pass us with their loads of salt are electrically operated; and most of the work in the mine is carried on by electricity.

When we ask our guide about the mining, he tells us that the salt is not touched by human hands from the time that it is taken from the walls until it is ready for shipment as a finished product. Machinery does all the hard work, while men stand by to see that the machines



do no loafing. Electric drills are used to bore holes in the solid salt walls. These holes are then filled with dynamite, which later is electrically discharged. The salt which is blasted loose is loaded into cars by shovels operated by electricity, and hauled by a tiny electric locomotive to a crusher near the elevator. Here it is broken into smaller pieces, after which it is generally hoisted to the surface to be prepared for shipment.

Fortunately, the guide tells us, the salt is so nearly pure that preparing it for shipment is rather a simple

process. First more crushing goes on, and then screens are used for grinding and grading. In addition to bricks or blocks of salt for livestock, there are ten different sizes and grades of salt put up in various kinds of packages for many different uses. It is packed in bags and packages that hold from one pound to two hundred pounds, or it is shipped in bulk in carloads of many tons.

Arranging Steps in Order

Take a sheet of paper and make a list of the things that are done in mining salt and in preparing it for market. Be sure you list the things in the order in which they are done. The first thing on your list should be "Holes are drilled in the solid rock walls."

Test of Word Meanings

Here are two lists, one of words and another of phrases that give the meanings of the words as they were used in this article. See if you can match each word with its meaning.

- | | |
|-------------|---|
| 1. hoisted | a. winding around and around |
| 2. cavern | b. an elevator |
| 3. coiling | c. passageway |
| 4. cave-in | d. lifted |
| 5. crusher | e. a falling in of the roof |
| 6. skip | f. a machine for breaking up the salt |
| 7. corridor | g. a cave or opening underground |
| 8. absorb | h. a very hard rock |
| 9. granite | i. take up or drink in |
| 10. in bulk | j. in large quantities, not in packages |

Reading Graphs

Have you ever stopped to think what your history or geography or science book would be like without any pictures? You are so used to pictures in books such as these that you may sometimes forget how much they help you to understand what you read.

A graph is a sort of picture that helps you to understand what numbers mean. This lesson will tell you about three kinds of graphs and will test how well you can read each kind.

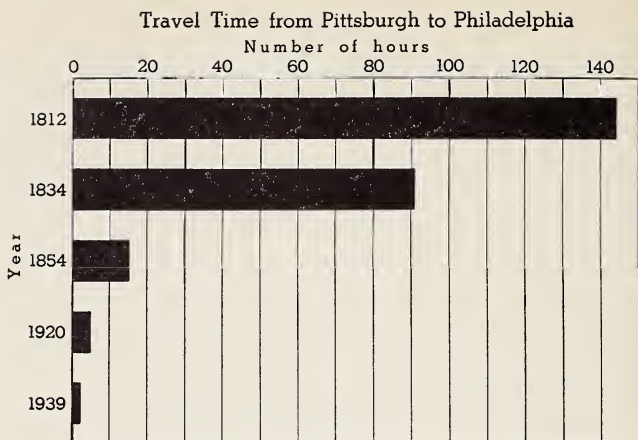
Read quickly the following paragraph.

In 1812 it took 144 hours to travel from Pittsburgh to Philadelphia by stagecoach. Trains made the trip in 91 hours in 1834, and by 1854 this time had been reduced to 15 hours. The fast trains of 1920 traveled from Pittsburgh to Philadelphia in 5 hours; and in 1939 airplanes flew from one city to the other in 2 hours.

"What a lot of dates and figures," you probably say to yourself as you finish reading the paragraph. Notice how different these same facts and figures seem when they appear on the bar graph on page 202. The information is clear, interesting, and easy to remember.

Study the bar graph in order to find the answers to these questions:

1. What is the exact title?
2. What facts are shown on the graph?
3. What is the main idea that the graph tells?



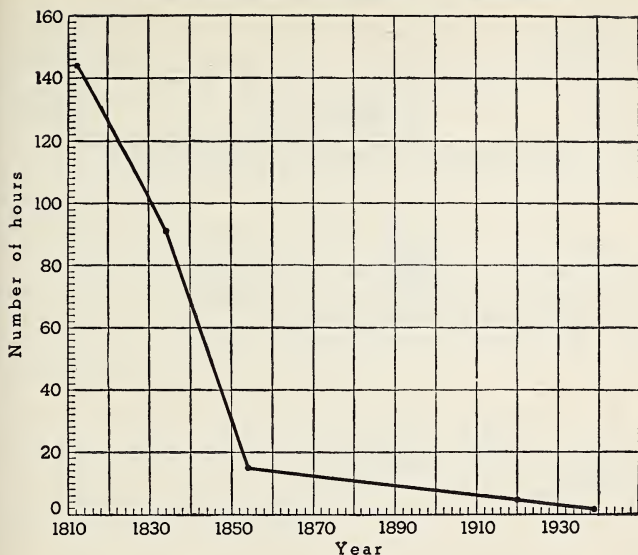
Whenever you read a graph, you should ask yourself those same three questions about it.

Now see if you can answer the following questions about travel time:

1. What is the earliest date for which travel time between Pittsburgh and Philadelphia is given?
2. What is the most recent date?
3. Between which years did the greatest reduction in travel time occur?
4. About how many hours did the trip take in 1812?
5. About how many hours did it take in each of the other years shown?
6. What is the difference in the amount of time required for the trip in 1920 and in 1939?

Nowadays several kinds of graphs are commonly used in magazines, newspapers, and books. Each kind of graph has its own special advantages. The facts

Travel Time from Pittsburgh to Philadelphia



about travel time were shown by a bar graph. They might have been shown by a line graph or by a picture graph.

Study carefully the line graph at the top of this page and answer these questions:

1. Where are the figures that tell the number of hours required for the trip?
2. Where do you find the year in which each trip was made?
3. Was the travel time reduced more hours between 1834 and 1854 or between 1920 and 1939?
4. Was travel time reduced more rapidly before 1850 or after 1850?

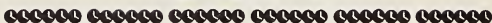
TRAVEL TIME

FROM
PITTSBURGH

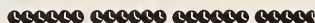
TO
PHILADELPHIA



1812



1834



1854



1920



1939



Each clock represents 4 hours of travel

From *The United States, A Graphic History*, by Hacker, Modley, and Taylor, published by Modern Age Books, Inc.

Probably the most interesting way of showing what figures mean is by using a picture graph. On the opposite page is a picture graph of the facts about travel time that have already been shown on the bar graph and the line graph.

1. What does the picture graph show that the other graphs do not?
2. How are the hours represented on this graph?
3. How can you find the number of hours required to travel from Pittsburgh to Philadelphia in 1812?
4. What does the picture graph show about the two cities?

Bar Graphs, Line Graphs, and Picture Graphs

A. Study all three graphs once more and be ready to discuss these questions:

1. Which graph shows most clearly the rate at which travel time was reduced?
2. Which graph is most interesting to you?
3. Which graph would be hardest for you to make?
4. What facts must you know in order to make any one of the graphs?

B. Look in recent magazines and newspapers for different kinds of graphs. Choose a committee to arrange a display of each kind on the bulletin board.

How Well Do You Remember What You Read?

Someone has said, "It isn't what you eat that makes you grow but what you digest." And it isn't what you read that counts but what you understand and remember.

A common way of studying a selection is to read it through once. Yet most students cannot even understand a selection by reading it a single time, much less remember what is in it. Studying a selection should mean much more than reading it through only once.

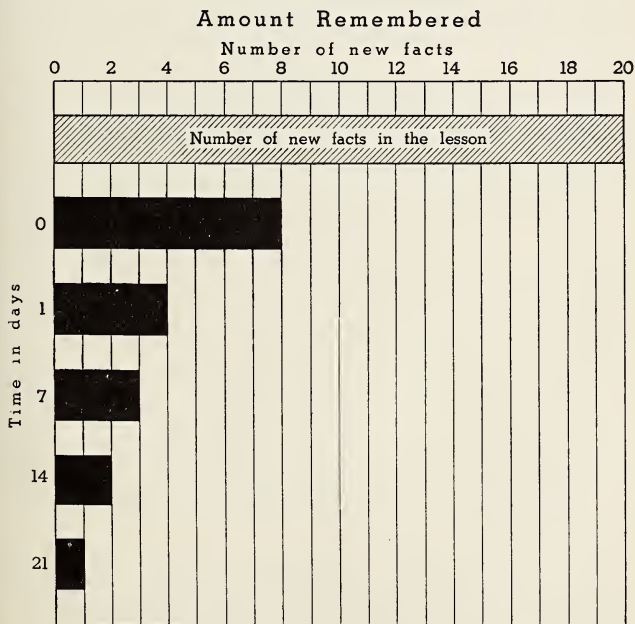
The amount that you remember after reading a selection only once depends upon four things. First, it depends upon how hard the lesson is. Of course you will understand and remember very simple lessons better than very hard ones. Second, it depends upon how much you already know about the facts given in the lesson. You will understand and remember fewer of the new facts than of those about which you already know. Third, it depends upon how well you can read. Fourth, it depends upon how much time has passed since you read the selection.

No one remembers everything he reads, and there are great differences among people as to the amount that is remembered. Very few pupils can expect to remember, even for a few minutes, as many as one half of the important new facts given in a selection. Most pupils will find that, even if they are tested as soon as they have finished reading, they cannot

remember more than two fifths of the new facts they have read.

For example, three hundred pupils read two pages about a problem in geography. They were tested as soon as they finished the reading. The average pupil knew just about two fifths of the important new facts on those two pages. The hundred best readers knew about half of these facts.

Now let us see how well these children remembered those new facts that they had read about. The amount they remembered at different times is shown by the bar graph at the bottom of this page.



The shaded bar in the graph shows 20, or all, of the new facts that were in the lesson that the pupils read. The first black bar stands for those new facts that were known at the time the first test was taken, immediately after reading. Follow the black bar out to 8. This means that immediately after reading the average pupil knew only 8, or two fifths, of the new facts that he had read.

Follow the bar that shows how much was remembered after one day. It reaches 4. This means that after just one day, the average pupil knew and remembered only one fifth of the facts that he had read. How many of the new facts that were known immediately after reading had the average pupil forgotten after just one day?

Now look at the bar graph that shows how many new facts were remembered after 7 days. It stops at 3. Follow the bar that shows how many new facts were remembered after 14 days. It reaches 2. This means that after two weeks the average pupil remembered only one tenth of the new facts he had read. What part of the new facts that he knew when the first test was taken did he remember after two weeks?

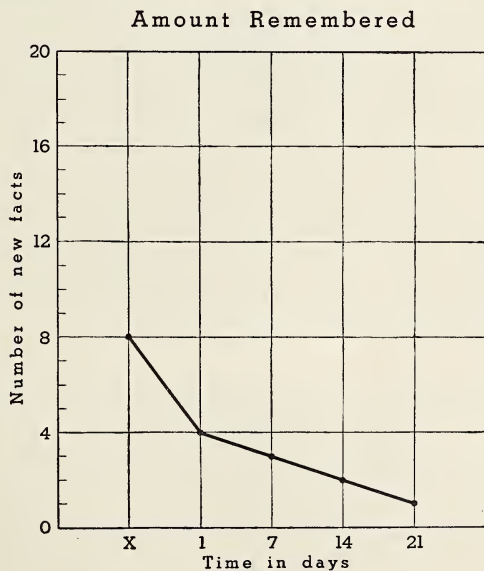
Now look at the bar that shows how many new facts were remembered after 21 days. It stops at 1. This means that only one twentieth of the new facts were remembered after three weeks. Only one eighth of the new facts known when the first test was taken were remembered.

The amount that is remembered after different times can be shown also on another kind of graph.

Look at the line graph at the bottom of this page. It shows the same things that are shown on the bar graph on page 207. You can tell the number of new facts remembered by looking at the numbers at the left of the graph. You can tell the times when the tests were taken by looking at the numbers at the bottom of the graph.

To read this graph start on the bottom line. Find the line going up and down marked X. Follow this line up to the top of the graph. Then look at the number at the left. The number is 20. This stands for all, or 20, of the new facts that the children read about.

Now follow the line marked X up to the place where it meets the heavy black line. Look at the number



to the left. The number is 8. This stands for 8 new facts, which means that immediately after reading the average pupil knew only two fifths of the new facts he had read. Now find, at the bottom of the graph, the line marked 1. Follow this line up to the place where it crosses the heavy black line. Then look at the number at the left. The number of new facts remembered after 1 day is 4.

How many new facts were remembered after 7 days? How many after 14 days? Compare the amounts shown on this line graph with those shown on the bar graph.

It is very important to remember how to read these two kinds of graphs, for they are used a great deal in books that you study at school.

These graphs show that the average pupil, even when tested immediately after reading a lesson, does not know all the new facts in it. They show also that he forgets rapidly. A good deal is forgotten in a day, and much more in a week. By the end of a few weeks, unless he reviews what he has learned, he will have forgotten most of what he knew. Perhaps you can now understand why a boy gave this definition of memory: "My memory is what I forget with."

Writing Summary Statements about Main Questions

One good way to remember the most important information in the lesson is to write summary statements about each of the main questions that are answered. In the lesson you have just read, three main questions

are answered. The directions in the next paragraph tell how to make a good summary statement for each one.

Read the first question given below. Think through the important points that you remember about it. Think of a good sentence covering these points. Now turn back to the lesson and read to see if you remembered all the important points. If your sentence did not contain all these points, make another one. When you have thought out a sentence that tells clearly the important points, write the sentence on your paper. Do this for each of the other two questions.

1. Why, in studying a lesson, is it not enough to read it just once?

2. How much of what one reads is remembered immediately after a single reading?

3. How rapidly does one forget the new facts that are known immediately after a single reading?

Can You Answer These Questions?

1. Is reading a lesson through once a satisfactory way of studying it?

2. After one day had the average pupil forgotten half of the facts that he knew immediately after reading?

3. How many new facts did the average pupil remember after three weeks had passed?

4. How many new facts did the hundred best readers know when they took the first test?

5. Did the average pupil forget more facts during the first day than he forgot in the next seven days?

How to Remember What You Read

Just as some scientists are trying to invent better machinery and to discover better ways of treating diseases, so other scientists are trying to find out better ways for people to remember what they read. These scientists have not yet found out everything there is to know about memory, but from what they have learned they advise you to do the following things:

1. Be sure that you know clearly, before you begin to read a selection, the exact purpose for which you are studying it. In school, no doubt, you will have talked the lesson over with your class and the teacher before you begin to study. You will have chosen certain questions that you should be able to answer from your reading. In the reading that you do outside of school you must decide for yourself what you expect to learn from what you read. It is usually easy to do this. For example, you may decide to read a book in order to find out how to build a radio.

2. Be sure to read carefully enough so that you understand exactly what the book tells you.

3. Decide what you should remember. Of course no one should try to remember everything he reads. Only the important things should be remembered. It is helpful when you have finished a paragraph to ask yourself, "What question does this paragraph answer?" If you think that the paragraph answers an important question, write that question on a sheet of paper. Save these questions to use later in testing yourself.

4. When you have finished the lesson, try to recall the important things in it. You may do this by trying to answer the important questions that you wrote down for each paragraph. After you have tried to answer each of these questions, turn back to the book to make sure that your answer is correct. If there is any question you cannot answer, study very carefully the part of the lesson that answers the question. Otherwise this part will give you trouble the next time you try to remember it.

5. Another good way to remember what you read is to make an outline of the main points in the lesson when you have read it through once. After you have written your outline, read the lesson again to see whether or not you have left out any important points. This helps you to remember the lesson as a whole.

6. Even when you feel sure that you understand all the important facts in a lesson, your study is not finished. Think over the important parts of the lesson several times. This will help you to remember them. Far from being wasted, the minutes you spend in these reviews will save you time in the long run.

7. You have been shown that even if you learn a lesson perfectly for the moment you will forget some of it within a few hours. In a few weeks you will have forgotten most of it unless in the meantime you have reviewed it. This means that you must come back to each important lesson after a few days or weeks. One way to do this is to save the questions that you wrote in preparing the lesson the first time, and then try to answer them after two or three weeks have

passed. You can then reread the lesson rapidly to see what you need to study again. By reviewing a lesson a number of times in this way, you can learn it so well that you will remember it for years.

Rules That Help You to Remember What You Read

The seven questions given below will help you to recall the rules for remembering what you read. Without turning back to the lesson, try to answer the questions. Do not write the answers. Say them to yourself. Remember not to turn back to the lesson.

1. What should you know before you begin to read?
2. How carefully should you read?
3. How can you use questions to help decide what to remember?
4. How can you use questions to help recall important points?
5. How does an outline help you to remember?
6. What should you do when you are sure that you understand all the important facts in a lesson?
7. How should you review important facts?

When you have answered as many questions as you can, read the lesson a second time. See whether or not you have omitted any rule. Find all the points you failed to remember. How much did you remember from a single reading of the lesson?

Now, without looking back at the lesson, write the rules that help you to remember what you read.

When you have completed the written work, follow the suggestion given in paragraph 6 on page 213.

More Dangerous than Dynamite

The best way to discover whether or not you have really learned "How to Remember What You Read" is to try to use the lesson as you study. The following lesson, "More Dangerous than Dynamite," is a good one to give you practice in using the rules for remembering what you read.

Try to use the rules you have just learned as you study this lesson. Do you remember what they are?

Before reading the lesson, ask yourself the question, "What is this thing that is more dangerous than dynamite?"

Next read the first paragraph. This is the introduction to the lesson. Be sure that you understand it clearly. Does it tell you anything that is important? If you think so, write the question that it answers.

Now read the second paragraph. Does it tell anything that you should remember? Can you ask the most important question that it answers? Sometimes a paragraph answers not only one main question but also other important questions. Does the second paragraph do this? Write out each important question that it answers.

Study each paragraph in the same way. Remember that you should write only the important questions.

When you have finished studying the last paragraph, try to answer the first question that you wrote. You need not write your answer. Then reread the first paragraph rapidly in order to see whether or not you answered the question correctly. If you did not remember all the important things in the answer, write a new question about the part of it you missed.

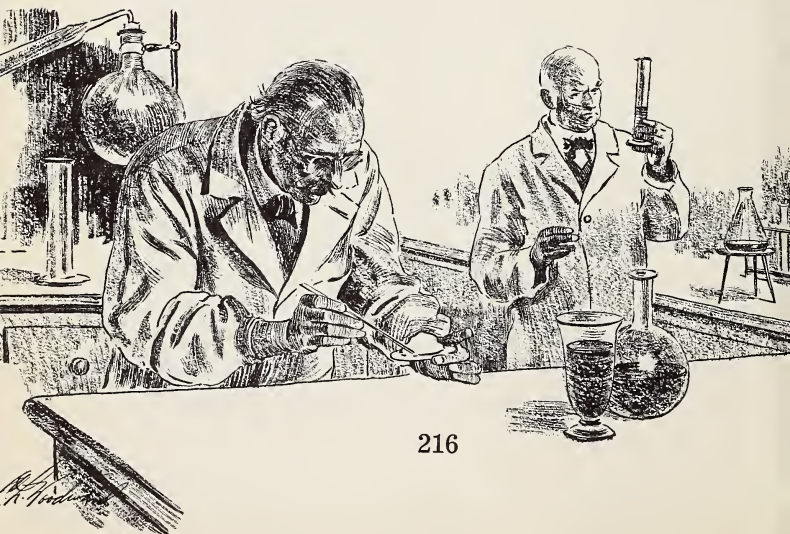
Do the same for each of the questions that you wrote.

When you have answered each of these questions in turn, go back and try to answer all the questions again. Give special attention to the questions that you did not have quite right on your first attempt.

Keep this up until you can answer each question correctly.

What shall you need to do in the future to make sure that you will not forget what you have learned? If you cannot remember what to do, read again the advice given in paragraph 7 on pages 213-214.

In 1867 a Swedish scientist, Alfred Nobel (nò běl'), invented something that he named dynamite. The people of that time were greatly amazed at the terrible explosive force contained in a small stick of this material. People still think of dynamite as something so dangerous that it must be handled with the greatest of care.



Today, however, we commonly use several liquids which have destructive power far more terrible than that of dynamite. The most common of these liquids is gasoline. Almost everyone uses it, and most people handle it without giving it much thought. Yet many people who handle gasoline very carelessly would waste no time in getting as far away as possible from a charge of dynamite. They probably do not know that the vapor from a single quart of gasoline, mixed with the air of an ordinary-sized living room, will make an explosive which, if set off, may do far more damage than a stick of dynamite. Besides, gasoline vapor is more easily set off than is dynamite.

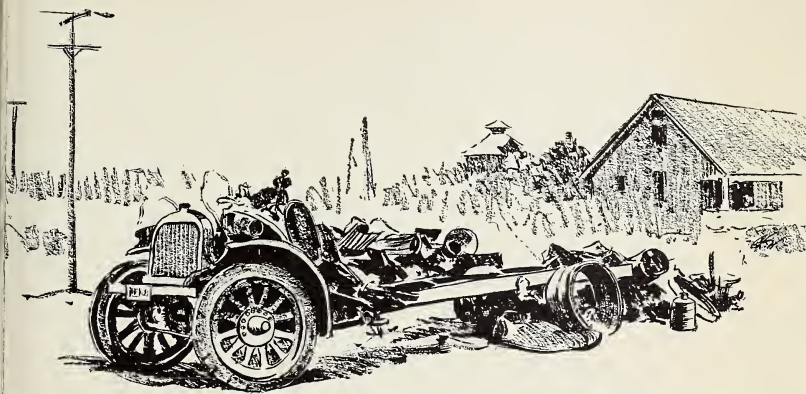
So long as gasoline is kept under control, it is one of man's most useful servants; but let it once have an opportunity to escape and turn into vapor and it will kill and burn. Nor is there anything mysterious about this dangerous power. Anyone can understand it. When gasoline is exposed to the air, either by being left in an open can or by being spilled, it turns into vapor, or gas. When it changes into vapor, it expands so greatly that one gallon will produce many hundred cubic feet of gas.

Most vapors quickly scatter through the air and float harmlessly away. Gasoline does not do this. It is heavier than the air. It will settle to the floor or ground and flow along like the water of a stream, filling every hole or low place. If there is no current of air to blow it away, it may stay in one place for days, unseen and unsuspected until a chance spark or flame touches it off. It is very important, therefore, that good ventila-

tion should be provided wherever gasoline is stored or used, in order that the vapor may be carried away.

A terrible accident that occurred in Downey, California, will show how powerful a gasoline explosion may be. A tank truck was filling a gasoline tank at a roadside service station. Some of the gasoline which spilled upon the ground turned into vapor. In some way a spark was struck, and as a result an explosion occurred in which the truck was thrown through the air a distance of forty-eight feet. One person was instantly killed, and others were burned so badly that they died from their injuries. Some people who were standing fifty feet away were covered by flames and their clothes were burned from their bodies. Persons who were more than one hundred and fifty feet away were blistered by the heat. Others who were two hundred feet away, although not burned, were thrown to the ground with great force. In one direction all the trees and grass were scorched for five hundred feet. The service station was completely destroyed. The picture on page 219 shows what was left of the truck.

Perhaps you have noticed the smell of gasoline around a service station. This means that the air has gasoline vapor in it. When the fuel tank of a car is being filled, it is almost impossible to avoid spilling some of the gasoline, which, of course, turns rapidly into vapor. If a large number of cars are filled, a great deal of gasoline vapor will be formed. On days when there is not much wind this vapor is not carried away quickly. You see why it is important that no one should ever smoke or light a match around a service station.



Many terrible accidents are caused by the use of gasoline in cleaning. To clean gloves and clothes with gasoline may seem a great convenience, but it is a dangerous method. It has caused many people to lose their lives and many buildings to be burned. The vapor of the gasoline spreads out in all directions, and if it comes in contact with a lighted cigar, a burning gas flame, a burning coal in a fireplace, or even the smallest spark, an explosion instantly takes place, with a flash of fire that sets ablaze any material near it that can be burned. A nail in one's shoe striking against metal may produce a spark. An explosion may even be caused by rubbing pieces of silk together while cleaning them. Those who use gasoline for cleaning purposes should remember that five cents' worth of gasoline is enough to blow up an ordinary house.

It is amazing that gasoline is set off so easily. In one case where gasoline was being used for cleaning, the vapor was carried outside a building to a lighted lamp nearly thirty feet away. There it took fire and flashed back to the building, which was entirely destroyed. In another case, the mere opening of a door between a room in which the gasoline was being used to clean a pair of gloves and a room in which there was a lighted lamp caused a destructive explosion.

It is always dangerous to clean clothing with gasoline. It is better to use some cleaning fluid that will not take fire. Several safe fluids can be bought at any drugstore. If gasoline is used at all for cleaning purposes, it should be used out of doors and away from fire of any kind.

Because of the way the vapor spreads, gasoline should never be poured down a sink. The vapor might even pass through the sewer and come up in another house, causing a serious explosion there.

Explosions are sometimes caused when gasoline which has been improperly marked and stored is mistaken for kerosene. Gasoline should never be used in attempting to start a fire. It is dangerous to start a fire with kerosene, but when gasoline is used for kerosene by mistake a serious accident may occur. Many terrible fires and explosions, some of them resulting in the loss of lives, have been caused by this mistake.

Everyone should know how to store gasoline. It should never be allowed to remain in an open container or in anything that is not tightly covered. It should never be kept in a glass bottle, for, if the bottle

is dropped, it may break and let the liquid escape. No one should keep a large amount of gasoline in or near a house. Many states now have laws requiring that any container for gasoline must be painted a bright red with the word GASOLINE in a different color. This is to prevent gasoline from being used by mistake for kerosene.

Boys and girls can do many things to prevent gasoline explosions. Some of these things they can do by themselves; some of them they can persuade their parents and older friends to do.

Making Rules for Preventing Gasoline Explosions

From the suggestions for using gasoline given in this lesson, make rules for preventing gasoline explosions. Rules that point out the chief things people need to be careful about in using gasoline can be grouped under three headings:

- I. *Handling Gasoline to Be Used for Motor Fuel*
- II. *Using Gasoline in Cleaning*
- III. *Storing Gasoline*

Write as many rules as you can, grouping them under the three headings. When you have finished writing your rules, put a cross before each one that boys and girls can follow in helping to prevent gasoline explosions.

The Law of the Jungle

Frank Buck knows about the jungle and jungle animals, for he has spent many years in capturing wild animals for circuses and zoos. In this lesson he describes the law of the jungle. As you read, find the answer to this question: What is "the law of the jungle"?

I. IN THE JUNGLE

The animals that live in the jungles and the great forests of Asia lead lives full of danger, for the law of the jungle is that only the strongest animals can live. The weak ones—whether they are savage tigers or great elephants, small squirrels or tiny mouse deer—cannot live long in the jungle. There, the strong are the kings, and the weak are the food of the strong.

To us this may seem like a cruel law. But it is a natural law, and it is the way wild animals have lived in the jungle since the beginning of time. The strong have killed the weak, not for the mere fun of killing or to show their great strength, but that they themselves may live, for animals must have food. To get their food, it is natural and right for them to use their fangs and claws in order that they may go on living.

My job is that of bringing wild animals back alive so that you may see them in the zoo and the circus. But I have never been able to bring the jungle back alive. Before I tell you about the animals that live there, I want to tell you about the jungle where these animals live, so that you will have a picture of it in your minds.

Thousands of square miles of Asia and the large islands that lie to the south in the Indian and Pacific oceans are still jungle—and most likely always will be. This jungle is thick and dense, and it grows fast. Its plants never really die, as some of our northern plants do, because this jungle territory is close to the equator, where the sun shines its hottest and heavy rains fall more often than in other parts of the world. The temperature stays at about a hundred degrees all the year around.

The jungle is always dark and dim. This is because there are really four layers to an Asiatic jungle. On the ground is a thick growth of jungle grass that is sometimes four or five feet tall. Above this grass rise bushes, thick, close together, and reaching six or eight feet above the grass. Then come the smaller of the jungle trees—trees about the size of our own oaks, elms, maples, and walnuts. But these jungle trees have much larger leaves that help to shut out the sun. Above these trees grow great ones that shoot a hundred or two hundred feet toward the sky. Their branches twine together and make a sort of tent over everything below.

Of course in the great tropical forests there are clearings here and there. Here many of the grass-eating animals come out to graze in the cooler hours of the early morning or late evening. Various fowl come here to dust and sun themselves, and the fiercer animals come out to hunt.

But you still haven't a picture of the real jungle that grows away from these clearings on all sides. All



the bushes, all the small and large trees, are bound together by great vines and creepers. These vines grow from the ground into the tree branches. From there they hang down, twist and grow together, and tie the bushes and smaller trees into such knots that you need a big two-foot knife to cut your way through.

This is the jungle where I capture the animals you may have seen in the zoo. This is the jungle where tigers live, and elephants, and great black panthers. This is the sort of place that is "home" to leopards, hyenas, apes, monkeys, and tapirs. This is where the orangutans, water buffalo, honey bears, and pythons live. This is where great crocodiles swim in the rivers, and where many beautiful tropical birds fly through the treetops.

Many years ago, when I first became interested in animals and decided to make them and their capture alive my job in life, I set up a camp in the jungle of northern Johore (jô hōr'). This is a country just north of Singapore (sĭng'gà pōr'), which is at the tip of the Malay (mâ lā') Peninsula. Johore is a wild spot, and its jungles are full of all kinds of animals and birds.

With my camp all set up, I called to Ali (ă'lê) my Number One boy. Perhaps I should tell you that it is the custom for every white man who travels in the East to have a servant, or several servants. These servants, or helpers, are numbered. Number One boy is chief, a sort of lieutenant, who is smarter than the rest, and the most help to his master, or *tuan* (tōō ăn').

"Ali," I called, "let's take a walk up a jungle trail."

Ali, who didn't know me very well that first year, looked at me as though I were slightly mad. You see, Malays, and most of the native people of the Far East, are rather lazy. They don't take *any* walk, or do *any* work, unless there is some reason for it.

"Tuan not feel well?" he asked.

"I feel fine!" I told him. "That's why I want to take a walk. I want to look over this jungle. Put that rifle of mine over your shoulder and come on."

He came—but he didn't see much sense in the idea. Why anyone should want to walk along a jungle trail was something Ali, who had lived near the jungle all his life, couldn't understand. But you will understand when I tell you all the strange things we saw there on that first walk of ours.

A few steps took us out of sight of camp, and the jungle closed in around us. We couldn't see more than fifty feet in any direction, because of the thick vines and creepers and trees that grew on all sides. But the trail under our feet was worn and smooth. It was an animal trail, and it had been made through the dense jungle by thousands of animals going to water. I knew that sooner or later we should come to a river or some water hole where the jungle creatures drank.

Before we had gone half a mile, I saw a strange thing. At first it looked like a shadow moving across the trail. I thought a great snake, a python, might be climbing in the branches of the trees overhead, and casting his moving shadow on the ground. When we got closer, I saw that it was no shadow at all. It was an army of marching red ants!



I have seen many armies of these ants. They move great distances on their tiny legs in search of new homes and new feeding grounds. They move in a column, just like an army, and they keep in line as well as trained soldiers on the march. Their column is about eight inches to a foot wide, and it may be a mile or even two or three miles long. Nobody knows how many ants there are in one of these armies, because nobody could possibly count them. I should say that such an army might contain over a hundred million of these tiny ant soldiers.

Think of a hundred million ants all moving together in a straight line! They never turn aside, but always go straight ahead *over* anything that gets in their path. I have seen them climbing over big fallen logs and trees in the jungle and even going up and down the sides of tall bamboo fences on rubber plantations. They seem to think it is easier to go over anything that gets in their way than to go around it.

I was standing on the trail, watching this army of ants, when Ali touched my arm.

"Tuan," he whispered, "here come pangolin!"

I saw a little animal with a long tail move out of the grass at one side of the trail. Ali and I stood so still that it didn't see us. But it saw the column of ants and moved toward them quickly.

Now a pangolin is also called a scaly anteater, because he does eat ants and he does have scales. These scales cover his whole body like the scales of a fish, only they are much larger and are as strong and hard as iron. He can raise and lower them as he wishes.



When in danger, a pangolin rolls himself into a ball with his scales closed so that they cover him like a knight's suit of armor. It takes a mighty big animal to hurt him through these scales.

Pangolins are gray in color. They can climb trees like cats. In the trees they feed on buds and the insects and bugs that live on ferns growing from the damp crotches of the jungle trees. They can hang on a limb with their long tails, then swing down and get the insects from the tree trunks with their sticky tongues.

Ali and I stood there on the trail and watched this pangolin. I wanted to see what he was going to do about this army of red ants. Of all food, a pangolin likes ants best. Here was the biggest meal this pangolin had ever seen in his life. Millions of ants were crawling across the trail, and all he had to do was put out his tongue and lap them up—which is the way a pangolin eats.

But this anteater had other ideas. He walked up to that moving army of ants, watched it a minute, then lay right across it!

The ants, of course, never stopped. A pangolin is not nearly so big as the jungle logs which ants sometimes crawl over, so they swarmed in their column straight over the pangolin. Now the pangolin opened his scales—and he left them open. The ants kept on moving. They crawled over and under every scale as millions behind kept coming forward.

Then the pangolin did a strange thing. He closed his scales. This meant that beneath his scales he was holding hundreds of ants prisoners, because the scales shut so tightly the ants could not get out.

That anteater had his dinner all right, but he couldn't eat it while it was under his scales! I watched him carefully to see what he would do next.

He got to his feet, looked around, and saw a small water hole on one side of the trail. It was rain water that had fallen into a hollow. The pangolin walked over to this hollow, waded in, and lay down in the water. Then he opened his scales. The ants he had caught beneath the scales floated to the top of the little pool. And that pangolin opened his mouth, put out his sticky tongue, and ate his nice, water-washed dinner.

You see what I mean about the law of the jungle. While it was pleasant for that pangolin to get his dinner so easily, it was hard on the ants that had to be his food. But this is the jungle law. Every animal is food for some other animal, and only the strongest can live.

A moment later Ali and I stepped over the army of ants—it kept on moving as if nothing had happened—and went on with our walk. We went slowly along the trail, with the jungle deep and dark on each side of us.

The Meaning of the Law of the Jungle

If you understand what the law of the jungle means, you should be able to choose the phrases that are right.

The law of the jungle means

- a. A law that the ruler of the jungle made.
- b. The usual way things happen in the jungle.
- c. A law to protect the weak from the strong.
- d. That animals destroy other animals in order to live themselves.

Taking Notes for an Oral Report

Plan to give an oral report about the one topic below that you think is most interesting.

Jungle Trees and Plants

An Army of Red Ants

The Pangolin

The following suggestions will help you prepare your report:

1. Reread the part of the lesson that tells about your topic. Find the main ideas.

2. On a piece of paper write the first main idea. Then find and write in brief form the important facts about it.

3. Do the same for each main idea.

4. Now, using your notes, say to yourself what you remember about each topic. Do not memorize your report word for word but make sure that you know all the facts well.

5. Your notes are to help you plan your report. Refer to them as little as possible while you are talking.

II. LIVING UNDER THE JUNGLE LAW

All at once I heard a queer sound. It sounded like a small hammer tapping on a cement block. We stopped and looked up into the trees from which the noise had come.

Thirty feet up on the side of a great jungle tree, I saw a strange bird hanging with clawlike feet on a small branch. The bird was almost as big as an eagle and as black as night. It had a huge curved beak, and with that beak it was pecking away at what looked like a patch of cement in the side of the tree. This was the sound Ali and I had heard—the tapping of this big beak against a wall of mud that had hardened in the tropic sun until it was almost as strong as cement.

"Little hornbill also inside!" Ali whispered to me.

This bird was a hornbill. I knew that inside that wall of hard mud, in a hollow in the great tree trunk, was a mother hornbill with her baby.

This is the way hornbills raise their one baby. The mother and father birds fly about the jungle until they find a large hollow tree. Together they peck away every piece of soft wood with their strong beaks and drop the pieces outside. When the inside of the trunk is clean, they build a nest there of dead leaves and moss. Then the mother hornbill goes inside and lays a single egg in the nest. A hornbill never has more than one egg or one baby in her nest at a time.

To protect the mother and the baby hornbill that will soon hatch out, the father hornbill builds a wall of mud across the opening in the tree trunk. He goes



to the nearest swamp or creek and brings back clay, a mouthful at a time, until the hole leading to the nest is sealed up. When this clay grows hard in the heat of the sun, it is almost as solid as the tree itself.

There is one other thing besides safety that hornbills have to look out for in this queer nest of theirs. This is food for both the mother hornbill and the baby bird when it is hatched. So in building their wall of mud, they leave one small hole in it. This hole is just large enough for the mother hornbill's beak. All the time the mother bird sits on the nest, the father feeds her through this hole. It takes a lot of frogs and mice and jungle fruit to do it, but the father hornbill seems mighty proud of his job.

Ali and I stood on the trail for a time and watched this hornbill high on the tree trunk. He was now tearing down the hard mud wall, and inside the trunk the mother hornbill was helping him. Then suddenly, through the opening they were making, I saw a small fluffy head with bright black eyes and a beak so large it looked funny on so small a baby.

"There's the young bird," I said to Ali in a whisper.

My voice was louder than I thought in the jungle stillness. The mother hornbill pulled her baby back into the nest, and the father made loud and angry noises while he glared down at us.

"Come on," I said to Ali. "Those birds are going to have trouble enough without thinking that we are going to hurt them."

I knew, you see, that those hornbills—like the ants and the pangolin—also lived under the law of the jungle. It was quite likely that, before the father and mother finished giving their baby his hunting lessons, something would happen to them. Hornbills teach their babies to catch frogs and mice for themselves. But during these lessons very often some bigger animal catches and eats the bird that is learning to catch and eat the frogs. It's the jungle law.

Ali and I went on and left the hornbills. We walked slowly along the trail, with here and there patches of sunlight falling through the leaves above us.

After a time we stopped to watch two raffalii (rä fäl' ĭ ē) squirrels playing on a branch. Almost every country in the world has its squirrels. You have seen them, of course, because they live everywhere.

But you probably never have seen a squirrel like the one called raffalii. It is by far the most beautiful of them all. It is colored as brightly as a bird—pure white, inky black, and rich red. Its head, back, and tail are as black as coal. Its sides and shoulders are a snowy white, and its under parts are a deep and lovely red.

Of all the squirrels in the world, this one has the easiest life. Squirrels that live in northern countries must put away nuts and food enough to last through the long winters. But the raffalii, which lives in the tropics where the climate is always the same, never has to worry about food. There is always plenty on all sides.

This squirrel does not even have to build a house to live in. Other squirrels have to find a hollow in a tree or dig out a hole in some fallen log in the woods. The raffalii's home is already made for him. In the damp crotches of jungle trees, basket ferns grow, and the center of these ferns is really shaped like a little basket. All the squirrel has to do is to jump in and be rocked to sleep as if he were in a treetop cradle.

As Ali and I watched these two squirrels playing on the branch above us, I couldn't help thinking of the jungle law again. This might really be their last day of play. Tonight maybe a civet cat or a leopard would catch them for food, for civet cats and leopards have to live as well as squirrels. Perhaps the civet that caught these squirrels would later be caught by a great leopard. It is the jungle law, the one by which all creatures live.

Ali and I turned back to the trail and went on with our walk. After a time we came to a wide river that led down to the sea. I had known that we should come at last to water, because all jungle trails lead there if you follow them long enough.

"Here river," Ali said.

It was a big river, smooth and clear, with the trees and vines on the banks showing in the surface of the water as if it were a looking glass.

Playing about in the water, near the top, were a number of large fish. These big fish, somewhat like the dogfish or small shark of American waters, come

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up certain rivers to feed along the banks. They are not very good as food, but the natives eat them when other food is hard to get.

As I stood there on the bank with Ali and looked down into the water at these big fish, I couldn't help thinking that here was a jungle creature that was safe. There was no other fish in those waters big enough to harm him. It seemed that here, for once, the law of the jungle did not work.

Even as I was thinking this, a swift shadow moved across the water. Looking up I saw a great white-and-black fish eagle flying with silent wings.

These Asiatic eagles are big, strong birds, about the size of an American bald eagle. They have a smaller head, but a sharper beak and more powerful claws. They eat squirrels and rats and monkeys—any small animal they can swoop down upon, grasp, and carry away. They eat fish too, dropping down on the water and catching them with their claws as our American fish hawks do. They are the fiercest and most cruel of all the birds that fly in Asia. They are the real kings of the air.

I saw now, as I watched this eagle, that these big fish in the river weren't so safe as I had thought. The eagle was out hunting for his dinner, and from high up in the sky he could see these fish swimming just below the surface of the water.

All at once he folded his wings against his sides and stopped flying. Without his wings to hold him in the air, he dropped straight down as fast as a stone. Like a bullet fired from a gun, he came toward the water. Just before his feet touched the river, he spread his wings again to stop his fall. But his hooklike claws went far enough beneath the surface of the water to catch into the back of one of those big fish I had thought so safe!

I watched to see the eagle flap his wings again and fly away into the sky with his fish dinner. But something seemed to be wrong! He beat his long wings and tried to rise. He made a white foam on the water all around him, but he couldn't take off. He fought and twisted about. He tried with all his might to fly away with that big fish. But he couldn't do it! And suddenly

I saw him slowly moving out across the river toward deep water.

I realized then what was wrong. The eagle had dropped out of the sky and sunk his claws into a fish that was too big for him to carry away. The fish was too heavy for the eagle to fly with. And he had struck so hard that his great claws were fast in the fish's back. He couldn't free himself, and the fish was swimming slowly toward the deep water of the river. In a moment he would dive below the surface and drown the great bird!

With a loud scream and a last flapping of his big wings, that eagle, ruler of the skies, sank below the water of the jungle river. That eagle had no enemies big enough to fight him in the air, but in the water of the river he met his match in a fish that was big enough to carry him out and drown him.

Since that first walk Ali and I took into the jungle, I have had many like it. I have seen many other strange things there. But I wanted you to take this first walk with me so that you would know a little more about the jungle and its law. In the wild countries of the Far East, in the great forests where I capture animals alive, it is the strong that live and the weak that die. It is the law of the jungle, and in the jungle it is a just law. It is the same law for the ants and hornbills, the squirrels and eagles, and even the fish. It is the law, too, for the great and strong panthers and leopards, the tigers and elephants.

Frank Buck (Adapted)

How to Ask Good Questions

These are three interesting topics in Part II of "The Law of the Jungle":

The Hornbill and His Family

The Raffalii Squirrel

The Eagle and the Fish

Select the topic that you think is most interesting. Then turn back to the lesson and reread the part about your topic. Make questions about your topic that are answered in the lesson. One example is given for each topic:

I. *The Hornbill and His Family*

What does the hornbill look like?

II. *The Raffalii Squirrel*

Why does the raffalii squirrel not worry about food?

III. *The Eagle and the Fish*

What does the Asiatic eagle eat?

You should be able to ask several questions about important information that was given on each topic. Do not ask questions about the very small details or questions that can be answered just by *Yes* and *No*. When you have finished, you will have another kind of outline.

You may wish to plan an oral report on one of these topics also. Your questions will serve as notes to help you prepare your reports. When the oral reports for both Part I and Part II of "The Law of the Jungle" have been given, you may choose the best speakers to give their reports to another class.

Can You Select the Right Meaning?

You have already learned how the dictionary helps you to pronounce words. Besides helping you to pronounce a word, the dictionary helps you to understand its meaning. Often you will want to look for both pronunciation and meaning at the same time.

Looking up the meaning of a word is not so easy as it seems. One reason is that what the dictionary tells about the word you are looking up may be difficult for you to understand. Suppose you should look up *valorous* and find the definition "full of valor." Unless you know what *valor* means, you must continue your search until you find its meaning. Only when you know that *valor* means "bravery" or "courage" can you tell what *valorous* means.

Suppose you found the words and definitions that are listed below.

persuade. To induce by argument or entreaty

plague. Anything that smites or troubles

invasion. A hostile or forcible entrance

evaporate. To turn into vapor

inspector. A person who inspects

Which of the words used in the definitions are so difficult you have to look them up in the dictionary? Can you see why looking for the meaning of a word may sometimes require real skill and effort?

A second reason why you may have some trouble with dictionary definitions is that so many words in our language have several meanings. Notice the definitions of *train* on the next page.

train (trān), *n.* 1. A part of a woman's gown that trails behind the wearer. 2. A number of followers or attendants; as, a prince and his *train*. 3. A moving line or file of persons, animals, vehicles, etc.; a procession. 4. A connected succession, as of ideas or thoughts; as, a *train* of thought. 5. A connected series of railway coaches, etc., usually hauled by a locomotive; as, *trains* pass through this town.

train'load'

train'man

When a word has so many meanings as this, you can easily understand why you must pick out the one that best fits the word as it is used in the sentence or article you are reading. Unless you choose the definition that gives the meaning of the word as it is used in what you are reading, you are not much better off than before you used the dictionary.

Find the word *possession* on page 60. Which of the definitions given for it best fits the meaning of the word as used in the following sentence? "This umbrella is my dearest possession," said Rebecca, "but such a care!"

Find the word *possible* on page 60. Which definition best fits the word as used in the following sentence? "It is possible that by tomorrow the ice will be thick enough for skating."

Sometimes the dictionary gives a sentence or phrase that helps to explain a difficult word by showing how it is used. On page 60 find and read examples of sentences or phrases that help to explain words. When you look up a new word, do not stop trying to learn

The definitions on pages 242 and 244-245 are from *Webster's Elementary Dictionary—A Dictionary for Boys and Girls*, Copyright, 1935, G. & C. Merriam Company, Springfield, Mass.

its meaning even if you do not understand the first definition that you find.

Definitions for the words underlined in the following sentences are given on pages 244-245. These definitions were copied from a dictionary. Read each sentence; then choose the definition that gives the meaning of the underlined word as used in the sentence. For each underlined word write down the meaning you select.

1. The letter reached its destination safely.
2. The huge structure of iron and steel was completed within a year.
3. Horseless vehicles were thought very queer when they first appeared.
4. The searchlight was trained on the wreckage.
5. There are many standard antiseptics that are safe to use on cuts.
6. People wrongly associate tinsel with the circus.
7. It was the desire of Pasteur's father that his only son should become a scholar.
8. In his graceful canoe, the Indian braved all kinds of waters.
9. Salt is used in packing houses for preserving and curing meats.
10. My own horse, startled with sudden fear, reared, plunged, and almost fell.
11. Only about a dozen primary products are obtained from coal tar.
12. Coal-tar dyes have aided our fight against infectious diseases.
13. From 1800-1879, the United States was swept by a yellow-fever epidemic every year except two.

an'ti-sep'tic (ăn'tĩ-sěp'tĭk), *adj.* Killing or making harmless the germs which cause decay or infection; as, iodine is *antiseptic*.—*n.* An antiseptic liquid, paste, or the like.

as-so'ci-ate (ă-sō'shĭ-ăt), *v.* 1. To join or unite as a friend, a companion, a partner, etc.; to unite in company; as, to *associate* with persons of one's own age. 2. To join things together; to combine; as, particles of gold *associated* with other substances. 3. To connect things in one's thought; as, he *associates* clowns with circuses.

brave (brāv), *adj.* 1. Fearless; courageous. 2. Showy.—*n.* 1. A brave person. 2. An Indian warrior.—*v.* To meet or face with courage; to defy; to dare.—**brave'ly**, *adv.*

cure (kūr), *n.* 1. A method or period of medical or healing treatment; as, a rest *cure*. 2. An act of healing; as, a doctor's *cures*. 3. Condition of being healed or restored to health. 4. A remedy; as, a *cure* for colds.—*v.* 1. To heal; to restore to health or soundness. 2. To preserve by drying, salting, etc.; as, to *cure* meat; to *cure* tobacco.

des'ti-na'tion (děs'tĩ-nā'shŭn), *n.* 1. The place set for the end of a journey; the goal; as, his *destination* was London. 2. The final purpose for which anything is intended.

ep'i-dem'ic (ěp'ĩ-děm'ĭk), *adj.* Spreading rapidly and attacking large numbers of people; as, an *epidemic* disease.—*n.* A rapidly spreading attack of disease, or of fear, panic, etc.; as, an *epidemic* of colds.

in-fec'tious (ĩn-fěk'shŭs), *adj.* Capable of infecting; as, an *infectious* disease.

plunge (plŭnj), *v.* 1. To thrust or force into; as, he *plunged* his family into debt. 2. To thrust oneself into water; as, he *plunged* in for a swim; hence, to sink or enter suddenly or violently; as, he *plunged* into debt. 3. To dip, descend, or move forward and downward, rapidly or suddenly; as, the boat *plunged* into a wave.—*n.* A sudden dive, rush, leap, etc.

pri'ma-ry (prĩ'měr-ĩ; prĩ'mă-rĩ), *adj.* 1. First in time, order, rank, etc. 2. Most important; principal; as, *primary* purposes. 3. Basic; fundamental; as, *primary* colors. 4. Having to do with the principal feathers of a bird's wing.—*n.*; *pl.* **PRIMARIES** (prĩ'měr-ĭz;

prī'mā-rīz). 1. A first, chief, or most important thing. 2. In the United States, a meeting of the voters of a political party at which the first steps are taken toward nominating candidates. 3. One of the primary colors. 4. One of the principal feathers of a bird's wing.—**pri'ma-ri-ly** (prī'mēr-ī-lī; prī-mâr'ī-lī), *adv.*

schol'ar (skōl'ēr), *n.* 1. A student in a school; a pupil. 2. A person who knows a great deal about one or more subjects; as, Longfellow was a *scholar* and a poet.—**schol'ar-ly**, *adj.*

stand'ard (stān'dērd), *n.* 1. A figure adopted as an emblem; the personal flag of the ruler of a state; loosely, a banner. 2. Something set up as a rule for measuring or as a model; as a *standard* of weight or quantity. 3. An upright support; as, a *standard* for a camera.—*adj.* 1. Giving or used as a standard for comparison or judgment; agreeing with such a standard; as, *standard* weights and measures; *standard* time. 2. Having a value that is recognized and lasting; as, *standard* authors.

struc'ture (strūk'tūr), *n.* 1. The manner in which anything is built; construction. 2. Something built, as a house, dam, etc. 3. The arrangement or relationship of parts, organs, etc., in anything; as, the *structure* of the eye.

struc'tur-al, *adj.*

struc'tur-al-ly, *adv.*

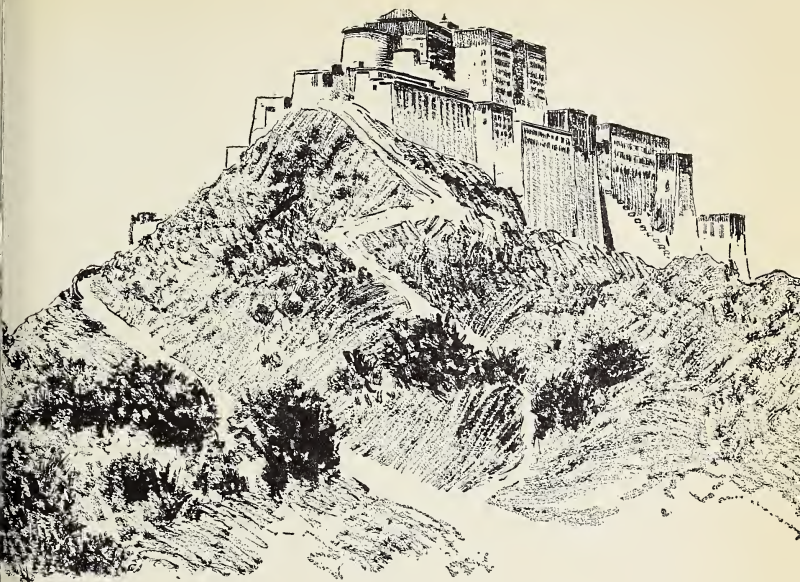
train (trān), *v.* 1. To cause to grow as desired; as, to *train* ivy along a wall. 2. To form by teaching; to rear; to bring up; as, carefully *trained* by their mother. 3. To teach so as to make capable or skillful; to instruct; as, to *train* a dog to beg. 4. To fit or be fitted for a contest by exercise, proper eating, etc.; as, the team is now *training*. 5. To aim or point at an object; to bring to bear; as, the enemy *trained* their cannon upon the fort.—**train'er**, *n.*

ve'hi-cle (vē'ī-k'l; vē'hī-k'l), *n.* 1. Any means of carrying persons or goods from place to place; a conveyance; especially, a wagon, a truck, a car, etc. 2. Any means by which a thing is expressed, transferred, or applied; as, music is a *vehicle* for the emotions.

Adventures in Tibet

Long before the first skyscraper was built in the United States, a great palace as high as a forty-story office building rose above a city almost unknown to the outside world. Even today few white men have visited the city of Lhasa (lās'ä) or have seen the huge palace. This "House of Ten Thousand Rooms," as it is sometimes called, was built three hundred years ago, when North America was not yet half explored. It is the home of a ruler whom millions of people worship as a "living god." He is called the Dalai Lama (dä li' lä'mä), or high priest. Tibet, (tī bēt'), the country over which he rules, is so high above sea level that it is called the "Roof of the World." Much of the land is higher than the tallest mountain in the United States. Mighty ranges of mountains surround the country on every side, so that it is difficult for people to travel back and forth between Tibet and other countries. Because the people of Tibet have





been so cut off from the rest of the world, many of them distrust foreigners and do not think it is wrong to rob and kill them, even when the strangers to the country have come on a peaceful visit.

Several years ago two American explorers, Rex Barton and Lowell Thomas, visited Tibet in a big airplane, the *Adventurer*. They were entertained in the palace of the "living god," who sent soldiers to protect them as they traveled about the country. In spite of their guard of soldiers, however, the Americans were attacked by robbers who tried to kill them. In the pages that follow, Mr. Barton and Mr. Thomas, the "Rex" and "Tommy" of the story, give a thrilling account of their journey through Tibet.

I. LIVING IN A SKYSCRAPER PALACE

As you read Part I of "Adventures in Tibet," try to find out as much as you can about these two questions:

What is the country of Tibet like?

How does the kind of country in which the people live affect their lives?

The *Adventurer* rolled to a stop on the Roof of the World, below the skyscraper palace of the Dalai Lama. People sprang up on the level plain around us as if by magic. They kept their distance at first, for they did not trust this bird of ours.

We sat still in the cabin. As the crowd edged closer, we could see how unfriendly it was. The boldest and ugliest men in the crowd were priests, or lamas, called "Red Hats." They are quarrelsome, fighting monks, who do not let the people forget that they dislike all foreigners.

A burly Red Hat picked up a rock and threw it at us. The crowd was growing bolder.



"If we don't get out of here, they'll be smashing something," I said, as a shower of stones landed around the plane.

"Start the motors, Tommy. It may give them a scare," said Rex.

The engines barked, then roared. The *Adventurer* moved slowly forward. A yell of fear went up. The crowd broke and ran. Pell-mell they scattered, in spite of their clumsy felt boots and big quilted coats.

We were wondering what we should do, when a troop of well-mounted horsemen came dashing toward us at full gallop. The soldiers' uniforms were like those of European troops, but we could see that the men were natives, and fine-looking fighters they were. A priest wearing a yellow hat rode beside the captain of the troop. The captain waved his sword, and the soldiers pulled up their horses in a cloud of dust. We climbed out of the cabin, and the priest greeted us in the name of the Dalai Lama, in very good English, too. We learned that this man was one of the few people of Tibet who had ever been to England.

We had left China that morning for one of the hardest, highest flights the *Adventurer* has ever made. The steep mountains that border Tibet on the north rose more than two miles above us. The lower slopes were dotted with pine trees, but as we climbed higher they became scarcer and smaller, stunted by the altitude and the sweeping winds, till they finally disappeared completely. In the barren soil among the rocks there was hardly enough grass to keep a goat alive.

Villages had become larger as we flew south. Finally the *Adventurer* had cleared the top of a range of barren hills, and there before us, on a broad plain, lay the capital city of Lhasa. Within the crumbling walls of the ancient town we saw many flat-roofed apartment houses, two and three stories high, crowded below the towering golden turrets of the lama cathedral. But the grandest building of all was just outside the city. It was the palace of the Dalai Lama, the head of the church and the ruler of Tibet.

The palace is called the *Potala* (bō tä lä). It is a huge building, almost a thousand feet long at the base of the steep hill up which it climbs. The flat roof of the tall, central part of the building is almost as high as a forty-story office building in the United States. The lower part of the building and the two great wings are built of whitewashed stone and brick. It was hard to realize that this skyscraper was built in Tibet while the Pilgrims were still living behind stockades on the shore of Massachusetts Bay.

I had landed the *Adventurer* near the irrigated gardens of the Dalai Lama. Tse-Chen (tz-chŭn), the priest who had come to our rescue with the troop of horsemen, now sent soldiers to guard the plane. He then guided us, while the rest of the soldiers followed, to the lower buildings of the Potala itself. A heavy wooden door in a whitewashed wall swung open, and we rode in. Monks of lower order than Tse-Chen hurried about, getting in one another's way.

Three sides of the courtyard were lined with stables and storehouses. Along the wall by the gate was a big

pile of dried manure, the best fuel in this country of few trees and no coal. We could not only see but smell that the courtyard was the place where refuse and waste from this building were thrown. Fortunately the dry air and the blazing sun of Tibet help to keep disease from spreading.

Tse-Chen led the way to a corner of the courtyard, where a narrow ladder served as the only stairway to the floor above. From the filth of the court below, Rex and I were led into a room that looked like a colored picture from a book of fairy tales. Every inch of wall was covered with bright silk hangings, red, blue, green, and yellow. A carved altar of gold, richly lacquered with red and blue, filled one end of the room. In the soft light we could see ornaments of jade, golden prayer wheels, bells, and offering bowls. In front of the altar stood a low screen of carved jade in a red-lacquer frame. The only other furniture was a low platform covered with thick felt blankets and huge silk pillows.

Tse-Chen sat down among the pillows and motioned to places for Rex and me beside him. We were hardly seated before a young priest brought us little china cups of thick tea on which floated a scum of rancid butter. Courtesy demanded that we drink every drop and lick the cups clean. The worst of it was that we were served tea at least twenty times a day! The people of Tibet, from the Dalai Lama to the herders of the plains, drink a small cup or bowl of tea every hour to keep up their strength in this cold climate, where there is so little fuel that it must be used, not for keeping warm, but for cooking.

Tse-Chen told us much about his people. He said: "Our only schools are for priests. They learn the teachings of our religion, but very few of them learn to read and write. Life is so hard for the common people and food is so difficult to get that children do not have time to go to school."

Tse-Chen told us that His Holiness, the Dalai Lama, would be pleased to see us the following morning. Then he showed us the next room, also decorated with silk hangings, which was to serve as our bedroom. Our bed was like the platform on which we had been sitting, but there was an additional pile of warm blankets.

"Is there a bath?" asked Rex. "A dip in a tub would make me feel a whole lot better."

Poor Tse-Chen was confused for a moment, but told us that a bath could be arranged. Then we learned that there are no baths in Tibet. The people never bathe because they think that, in their unheated houses, they would catch cold and probably die of pneumonia. We ended by washing our hands and faces in a small bowl. When we had finished, the servant who was waiting on us stepped to the balcony outside our room and threw the water into the courtyard.

Selecting Facts That Are Related

Skim through Part I of "Adventures in Tibet" to find parts of sentences that give the following information:

1. Facts about the climate, soil, and surface of Tibet
2. Facts about ways in which the climate, soil, and surface affect the way in which the people live

Copy on your paper the parts of sentences that you select. After each group of words, write the number of the page where the sentence is found. For example, in a paragraph on page 249 are the words "barren soil among the rocks." You would write

"barren soil among the rocks," p. 249

The page numbers will make it possible for you to find and read a sentence quickly when you later compare your work with that of others in the class.

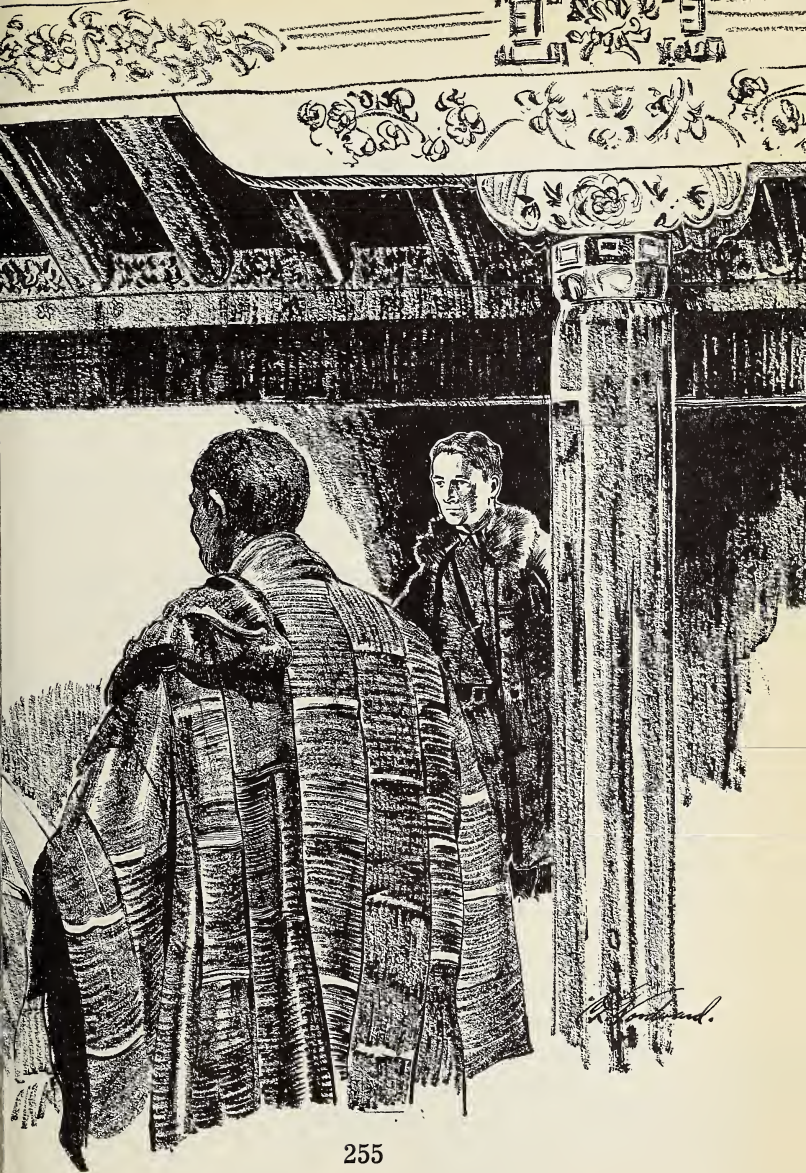
If you finish writing your list before your classmates, go over it carefully. Pick out all the facts that tell about the soil, climate, and surface of Tibet. Call these facts *causes*. Then study your list again in order to find an *effect* that is related to each cause.

II. THE ATTACK ON THE CARAVAN

Read Part II to see if you can find facts not told in Part I about the country of Tibet and the way in which its people live.

Next morning we were taken to see His Holiness, the Dalai Lama. Our conversation was carried on through Tse-Chen, who acted as interpreter, for the Dalai Lama does not speak English, and we could not speak his language. He asked us many things about America. He would like to improve the living conditions of his people. He would like to have schools. He would like to teach his people the healthful value of cleanliness. He would like to see more trade carried





on between his people and the outside world, because when people exchange goods they also exchange ideas. And the Dalai Lama believes that good modern ideas would help his people.

The Dalai Lama told us that many of his people were so unfriendly to foreigners that he had ordered a troop of soldiers to go with us on our tour through the country, and that he had asked Tse-Chen to go with us as our guide and interpreter.

During the next few weeks we traveled on a thrilling journey. Tse-Chen fitted out a caravan of many pack animals for us, and with our troop of soldiers mounted on horses we looked like a royal parade as we traveled day after day to the north and east.

Finally we came within the shadow of the towering ranges of the Himalayas. Here was a great valley through which ran the Sanpo River, the most important river of Tibet. In this country, where there are neither railroads nor automobiles, the Sanpo River and the smaller streams that flow into it serve as valuable highways, on which are located all the important towns.

We were returning to Lhasa when we had our most exciting adventure. About eight days' march from the city we joined a caravan that had been plodding its weary way for months, carrying silks and brick tea from China. The merchants in this long caravan of hundreds of animals—yaks, horses, cattle, and even sheep—were afraid of brigands, and well they might have been, for they were poorly armed. When we first joined the caravan, some of the merchants were suspicious of us, fearing that our soldiers might fall upon

them and rob them. But Tse-Chen made them understand that we were friends.

The caravan had broken camp very early one morning and was on the march long before daylight, in order to cover as much distance as possible before the biting winds of midday should make travel difficult and slow. Our party stumbled through the half darkness at the head of the long column. The rough trail led higher and higher up a narrow gorge, whose steep cliffs almost pinched together at its head. The stillness was broken only by the scrape of hoofs on the rocks and the occasional shout of a driver to his beast. Suddenly, just

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after we had passed though the narrowest part of the gorge, a shower of rocks and stones was thrown from the cliffs above, accompanied by blood-curdling yells.

"Brigands! Brigands!" Up went the shouts from every throat. Terrified animals squealed with pain and broke from the line, dashing wildly in every direction, trampling men and other animals with their sharp hoofs. My own horse, startled with sudden fear, reared, plunged, and almost fell. I could see men slipping through the shadows, striking at the frightened animals, trying to drive them away. I knew they were robbers who were trying to steal the valuable loads of tea and silk. Above the noise I could hear Tse-Chen calling the soldiers together.

Just then, as the sun poked his surprised head over the horizon, Tse-Chen charged with his soldiers into the struggling, fighting mass of men and animals. Swinging sabers flashed and cut and flashed again. The robbers were overpowered and made prisoners in short order. Animals were rounded up, saddles repaired, and packs straightened.

While this was going on, Tse-Chen had the brigands brought before him. He found that they were lamas from a Red Hat monastery, two days' march away, and that they had intended the shower of rocks for Rex and me, in the hope that it would kill us. They hated these foreigners, they explained, whom the Dalai Lama had allowed to go through the country, and they felt it their duty to do away with them. They also thought that, while they were about it, they might just as well rob the caravan.

Poor Tse-Chen shook his head in apology and told us the men would be punished when he brought them to Lhasa.

"What chance have our people to become great and tolerant if they will treat even guests of our government like this?"

When we were alone, Rex said to me, "I think we had better leave Tibet as soon as we get back to the *Adventurer*." I agreed with him. A few days later we took off and flew to China.

Lowell Thomas and Rex Barton

Selecting Sentences That Give New Ideas about a Topic

Skim back through Part II of "Adventures in Tibet" in order to find new information about the country and its people. Be prepared to read aloud sentences giving the information that you select.

Using a Dictionary to Find Meanings

Did you meet some new words in "Adventures in Tibet"? Perhaps there were words that prevented you from getting a clear picture of certain parts of the story, although you were able to follow the main events. No doubt you could get a general idea of the meaning of some of the words that were new to you from the way that they were used in sentences. Probably, however, you would have enjoyed the story more if you had

understood clearly what these words meant. It will help you to enjoy more fully another story in which these words appear if you are able to give clear and accurate meanings for them.

Some of the interesting words and the sentences in which they were used in "Adventures in Tibet" are given on the next pages. Check your understanding of these words in this way. First read the sentence. Then think about the meaning of the underlined word. If you do not know the meaning, find the word and its definition in the list given on page 262.

These definitions are taken from a dictionary. Since words may have several meanings, more than one definition is given for most of the words in the list. In some cases the exact form of the word used in the sentence is not given. For example, in the second sentence on page 261 the word *stunted* is used. The form of the word given on the dictionary page is *stunt*. However, you can easily tell what *stunted* means, once you know the meaning of *stunt*.

Read the definitions carefully and choose the one that best fits the word as it is used in the sentence. Then read the sentence again and see if you can put the meaning you chose in place of the word. The two sentences below show how to do this. Be sure to look for the word *burly* among the definitions.

"A burly Red Hat picked up a rock and threw it at us."

"A large and strong Red Hat picked up a rock and threw it at us."

Do not write the sentences, but write the words, with the definition you choose for each. This is the way to write the word used in the example:

burly, large and strong

Now choose and write a definition for each underlined word below. Your definition may not always fit smoothly into the sentence, but it should give the meaning of the word as it is used in the sentence.

1. Pell-mell they scattered, in spite of their clumsy felt boots.

2. As we climbed higher, the trees became scarcer and smaller, stunted by the altitude and the sweeping winds, till they finally disappeared completely.

3. Within the crumbling walls of the ancient town we saw many flat-roofed apartment houses, two and three stories high, crowded below the towering golden turrets of the lama cathedral.

4. It was hard to realize that this skyscraper was built in Tibet while the Pilgrims were still living behind stockades on the shore of Massachusetts Bay.

5. We could not only see but smell that the courtyard was the place where refuse and waste from this building were thrown.

6. A carved altar of gold, richly lacquered with red and blue, filled one end of the room.

7. We joined a caravan that had been plodding its weary way for months.

8. A young priest brought us little china cups of thick tea on which floated a scum of rancid butter.

9. Poor Tse-Chen was confused for a moment, but told us that a bath could be arranged.

10. The merchants were afraid of brigands, for they were poorly armed.

al'ti-tude (ăl'tĩ-tūd), *n.* 1. The height of an object above a given level, especially above sea level; as, the *altitude* of a mountain.

2. A high position or region.

brig'and (brĩg'ănd), *n.* A bandit.

bur'ly (bũr'li), *adj.*; **BUR'LI-ER** (-li-ēr); **BUR'LI-EST**. Large and strong.—**bur'li-ness**, *n.*

con-fuse' (kõn-fũz'), *v.* To perplex, confound, or embarrass; to mix; to mistake for another; to throw into disorder.—**con-fus'ed-ly** (kõn-fũz'ĕd-li; kõn-fũzd'li), *adv.*

lac'quer (lăk'ēr), *n.* 1. A varnish made of shellac and alcohol; also, any resinous varnish. 2. An ornamental article coated with lacquer.—*v.* To coat with lacquer.

pell'mell', **pell'mell'** (pĕl'mĕl'), *adv.* In crowded confusion or disorder; also in very great haste; with headlong hurry.

plod (plõd), *v.*; **PLOD'DED**; **PLOD'DING**. 1. To move or travel slowly but steadily; to trudge. 2. To toil; to drudge; as to *plod* away at one's studies.—**plod'der**, *n.*

ran'cid (răn'sid), *adj.* Having a strong, disagreeable smell or taste resulting from decay, etc.; as, *rancid* butter.—**ran'cid-ness**, *n.*

ref'use (rĕf'ūs), *adj.* Refused; worthless; as, *refuse* matter.—*n.* Rubbish; waste.

stock-ade' (stõk-ăd'), *n.* A fence of logs, stakes, etc., used as a barrier or defense.

stunt (stũnt), *v.* To hinder from normal growth, progress, etc.; to dwarf; to check.

tow'er-ing (tou'ēr-ing), *adj.* 1. Lofty; very high. 2. Extreme; violent; as, *towering* rage.

tur'ret (tũr'ĕt), *n.* 1. A little tower, often at a corner of a building. 2. A tower, heavily armored and usually revolving, in which heavy guns are mounted, as on a warship.—**tur'ret-ed**, *adj.*

The above definitions are from *Webster's Elementary Dictionary—A Dictionary for Boys and Girls*, Copyright, 1935, G. & C. Merriam Company, Springfield, Mass.

Where We Got Our Words

"George," said Mrs. Brown to her son, "will you go to the grocery store and buy a large squash, a can of tea, a pound of coffee, a package of noodles, and four pounds of hickory nuts? You will find a basket in the garage."

George said: "All right, Mother. May I ride my bicycle?"

If you were asked whether George and his mother were speaking a foreign language, you would say no, and you would be right. Yet many of the words that they used have been borrowed from foreign languages. *Squash* and *hickory* are from the language of the American Indians, *tea* from the Chinese, *coffee* from the Turkish, *noodles* from the German, and *garage* and *bicycle* from the French. However, the French made the word *bicycle* from two words which they had borrowed themselves—*bi* from the Latin, meaning "two," and *cycle* from the Greek, meaning "wheel."

All languages have borrowed some of their words from other languages, but the English language has borrowed more words than any other of the great languages.

The English language has grown out of the early Anglo-Saxon language, which was spoken in England more than a thousand years ago. Words taken from this early language are called "native" words. Most of the words that you use frequently are native words. For example, the twenty-five words most often written in America are *I, the, and, to, a, you, of, in, we, for,*

it, that, is, your, have, will, be, are, not, as, at, this, with, but, and on. Every one of these words is an early Anglo-Saxon word; that is, a native word.

Words taken from other languages are called "loan" words. More than half the words now used in England, in the United States, in Canada, and in Australia are loan words. Of these loan words, more than four fifths are borrowed from the French, the Latin, or the Greek.

We have borrowed words from other languages in almost every part of the world. For example, we have taken from the Chinese the word *pongee*; from the Javanese, *gong*; from the French, *automobile*; from the Dutch, *Santa Claus*; from the Spanish, *cigar*; from the Hebrew, *cider*; from the Arabic, *alfalfa* and *sherbet*; and from the American Indian, *squaw* and *tomahawk*.



Many foreign words came into our language before the English settled in America. Others were borrowed by the English settlers in the new country. When the English first came to America, they found many things that were different from what they had known in England. They had to find words for these new things. Some of these new things were given names which the settlers already had for similar things. Sometimes the settlers made new words by putting together two or more words which they already knew. Sometimes they took words from the Indian language, and sometimes they borrowed words from the settlers of other nations.

How the early settlers found names for new objects is shown in an interesting way in the case of the grain

which we now call *corn*, but which the American Indians called *maize*. Maize did not grow in Europe, and although the first settlers in Virginia may have heard of it through the stories of travelers, they had never seen it until they came to America. In this case, however, the settlers did not adopt the Indian name. Instead they called the new grain *corn*, because in England all grains, such as wheat and oats, were called corn. The name *ear* was taken over from the ear of oats or wheat, which they knew. The Virginians sometimes called the cob the *husk*. Captain John Smith called it the *core*. What we now call the *husk* of the corn was sometimes called the *leaves* and sometimes the *shuck*.

The settlers also put together many old words to make new ones. When they found a snake with a rattle on its tail, they called it a *rattlesnake*. They found a large frog here that made a noise, as they said, like a bull. They soon gave it the name *bullfrog*. In a similar way they made words like *backwoods*, *log house*, *popcorn*, *bobsled*, *sidewalk*, *salt lick*, and *apple butter*.

In the new country the settlers found many strange animals, foods, and objects of various sorts. Instead of trying to use a word of their own, as in the case of *corn*, they borrowed many words from the Indians. Among such words are *moose*, *skunk*, *pecan*, *chipmunk*, *hominy*, and *toboggan*, not to mention such words as *wigwam*, *tomahawk*, *papoose*, and *moccasin*, which we more often associate with the Indians.

Some proper names came from the Indians. Many of

the geographical names in Canada are the names the Indians used. *Saskatchewan* means "swift current," while *Manitoba* means "strait of the spirit." More than half the states in the United States have Indian names. Some of these, such as *Alabama* and *Iowa*, are taken from the names of Indian tribes; others, from words used by the Indians to describe the region. *Arizona*, for example, is from an Indian word meaning "few springs." *Utah* means "in the tops of the mountains," and *Michigan*, "a great lake." Many cities, such as Miami, Omaha, and Cheyenne, have Indian names, as have some of the greatest rivers, such as the Ohio, the Missouri, and the Mississippi. You can see that we got from the Indians many of the words which we commonly use.

The English settlers also borrowed many words from the settlers of other nations who had come to North America. You may have learned that the French settled in Canada, the Dutch in New York, and the Spanish in Mexico, the West Indies, and in the southern part of what is now the United States. From the French, the English settlers borrowed such words as *bureau*, *levee*, and *prairie*; from the Dutch, *cook*, *sleigh*, *snoop*, *waffle*, and *Santa Claus*. Who would think that this last word, so familiar to American boys and girls, is a Dutch word? Some people say that even the word *Yankee* came from the Dutch.

More words were borrowed from the Spanish settlers than from those of any other European nation. Some of these words the Spanish themselves had probably borrowed from the Indians in the West Indies.

Among such words are *tobacco*, *hammock*, *tomato*, and *tapioca*. Other words, such as *alligator* and *sassafras*, are really Spanish words. Americans later took over many other Spanish words, such as *bronco*, *rodeo*, *canyon*, *corral*, *coyote*, *ranch*, and *lariat*.

You can see that from one point of view every American boy or girl speaks several foreign languages every day. Yet we have made the loan words from these languages our own, so that it is now proper to call them American or English words. Our language is very much richer and more useful because of these borrowed words.

Summarizing Ideas

1. The last sentence says that our language is richer because we have borrowed words from other languages and added them to our own. Make a chart like the one suggested below. It should show from what languages we have borrowed words and should give illustrations of words borrowed from each.

SOME LANGUAGES FROM WHICH WE HAVE
BORROWED WORDS

<i>French</i>	<i>Chinese</i>	<i>Turkish</i>		
bicycle				

2. How did the early settlers get words for the new things, new places, and new experiences they found in this country?

How Much Is \$100,000,000?

Often very large figures are needed to tell about business conditions, health conditions, or other things about which we wish to read. Many people have trouble in reading these large numbers. Can you read all the figures in the following paragraph?

From 1800 to 1879, the United States was swept by a yellow-fever epidemic every year except two. In 1878 the year's bill for this one disease was more than \$10,000,000 for New Orleans, and more than \$100,000,000 for the entire country.

Did you understand clearly the large numbers in the paragraph you just read? This exercise will show you how well you understood the numbers and also will teach you how to think about other big numbers that you may read in your later work.

Notice that the national bill for yellow fever in 1878 was about \$100,000,000. Few of us can understand what \$100,000,000 means unless we compare it with something else we already know about. For example, let us think of a modern school building, with a library, laboratories, gymnasiums, auditoriums, and other up-to-date equipment. Think of a school large enough for 1000 pupils and costing about \$1,000,000. Then we can see that \$100,000,000 would pay for about 100 such modern school buildings, and we get a picture of what \$100,000,000 means.

Now study the costs of the things in the following list. You will need to use these facts later.

1. A modern school building in a city costs about \$1000 per pupil, or \$1,000,000 for 1000 pupils.

2. Concrete roads cost about \$40,000 per mile for a new roadway 18 feet wide.

3. The Arlington Memorial Bridge over the Potomac River at Washington, D. C., together with the Arlington Memorial Highway, cost \$14,750,000.

4. The cost of the Panama Canal, with improvements made up to a recent year, was \$550,000,000.

Use these costs to answer the questions below:

1. If New Orleans now had the \$10,000,000 which it spent to fight yellow fever in 1878:

a. How many modern school buildings each large enough for 1000 pupils could be built with the money?

b. About how many miles of 18-foot concrete road could be built?

2. If the United States had the \$100,000,000 which was spent in fighting yellow fever in 1878:

a. About how many bridges like the Arlington Memorial Bridge could be built?

b. Would this amount pay for the cost of the Panama Canal up to a recent year? If we saved \$100,000,000 a year, how many years should we need to save in order to pay this cost?

Using the information about costs, write several questions about the large numbers in these sentences.

1. The loss caused by the grasshopper plague in the United States in 1876 was about \$200,000,000.

2. In 1937 almost \$3,000,000 worth of timber was cut from the national forests.



Reading Aloud to Others

So far this book has not given you any special help in reading aloud to other people. You have been doing the kinds of silent reading which boys and girls need to do by themselves in order to study well.

There are many times when you need to read aloud to others. Sometimes you can make a point in geography or history more clear if you read aloud a few sentences from a reference book. Sometimes you need to prove that you are right or to explain your statement by reading from a book. Sometimes you wish to read to other people the rules of a game, the explanation of some contest, an announcement, or a notice. And very often, no doubt, you find poems or stories or parts of stories which are so interesting that you would like to read them to the rest of the class.

Why is it that you like very much to hear some people read but dislike to listen to others? Here are some things which good readers do.

1. Good readers select very carefully what they are to read. They try to choose an interesting story or a worth-while article, one which their listeners will surely enjoy. If they are reading to prove a point, they read only the sentences that are necessary. If they are reading an interesting story or part of a story, they select one which is not too long to be interesting.

Here is the first rule:

If you want people to like to hear you read, select your story or article carefully.

2. Good readers know well the story or article which they are to read. In the first place, they know the exact meaning of what they are to read. It would be hard to give the meaning to other people if the readers themselves did not know the meaning. In the second place, they know the words in the selection so that they do not pronounce them incorrectly and spoil the meaning for the listeners. This all takes time and study, but it is necessary if people are to read aloud well.

The second rule is:

Know well the selection you are to read aloud.

3. Good readers keep their audience interested in what they are reading. They read loudly enough to be heard easily. They read clearly, so that the listeners do not have to guess what they are saying. They make the important points in the selection stand out plainly, and they read with expression so that the characters talk like real people. Good readers work and practice to do all these things well, in order to keep their audience interested.

And so the last rule is:

Keep your listeners interested to the very last of what you read.

Trying to Remember

What have you learned in this lesson that will help you in choosing and preparing selections to read aloud? Can you remember the three rules for reading aloud well? What suggestions that would help you to carry out each rule were made?

1. Copy on your paper the title and the skeleton outline given below.

2. After the Roman numerals I, II, and III, try to write the three important rules.

3. Fill in the rest of the outline with the suggestions that belong to each rule. Do this without looking back at the lesson.

4. When you have filled in as much of the outline as you can, turn back to the lesson and read it again in order to complete and to correct your outline.

5. Read the completed outline through carefully. Try to remember it.

6. Now turn your paper over. Copy the skeleton outline once more, then close your book, and again try to fill in the skeleton outline from memory. *Do not write in this book.*

How to Become a Good Oral Reader

I.

A.

B.

C.

II.

A.

B.

III.

A.

B.

C.

D.

Whenever you are planning to read aloud, refer to the rules and suggestions in this lesson as a part of your preparation.

Simba's First Lion

When you are preparing a report on a problem in geography or history, you may use a book that other members of the class will not read. You sometimes find a part of the book that you should read to the whole class because it gives important help in understanding the problem the class is studying. Perhaps the part you like describes a scene so well that you are able to see it clearly. Perhaps it tells about events in such a way that you are able to understand how the characters in the story felt. You may feel that much of the interest and value of the story would be lost if you tried to tell these parts in your own words.

The story that follows is from one of the books that a class of boys and girls read in order to answer the question, *How do the natives of British lands in tropical Africa live?* Read straight through to get the whole story. Then choose some short part of the story that tells important facts, or is very interesting, to read aloud to the class. As you prepare to read the part you have chosen, follow the rules for good oral reading that you learned in the last lesson.

Near the edge of a forest in East Central Africa, where the plains meet the jungle, is a tiny mud-walled village. It lies in a grove of great trees on the bank of a small river. Within the walls, which are piled high with thorn brush in order that lions may not enter the village during the night, are little grass-roofed huts of mud.

This village is the home of Simba. When the boy was very young, his father killed a lion, rubbed the



fat of the beast on his little son's head to make him brave, and gave him the name Simba, which means "lion" in his language.

One morning, at the hour of letting out the cattle, Simba stood near the gate of his mud-walled village. In his hand was a herding spear about five feet long. About him were other boys of his own age carrying similar spears, all of them shouting at the cattle, which were crowding through the narrow opening in the wall. From time to time, when some unruly cow would turn back into the village, a boy would leap nimbly after her, prodding her sides and yelling shrilly until she would turn, with tossing horns and rolling eyes, to join the others on their way through the gate.

Dust rose in clouds. Simba's slender body was covered with it, for it clung to the sweat that rolled down his ribs and stomach. For a week now Simba had been responsible for herding his father's animals, and he was a proud boy. He was no longer a child. With his hunting bow he could bring down a monkey from the tallest tree, driving the bamboo arrow clean through its body. Across hard ground he could track game by means of signs visible only to eyes trained to notice the tiniest details—a scratch on the rocks, a turned pebble, a blade of grass out of place. Watching the skilled warriors of his village, listening to the tales of his people, trained by his father, he had learned the things that would get him food and save his life from savage men and beasts. Simba was only eleven years old, and his body was the slender, slim-muscled one of a boy, but he knew and could do many things,



for his school had been the hard one of his race, where death and hunger and suffering are the price of mistakes.

Finally the boys started cutting out their own cows. Driven by their herders, the cattle began moving off toward the hills, where they would graze all day. When the shadows of the mountains began to creep across the plains, they would be driven back again to spend the night where no lions or leopards could kill them, safe within the walls of the village.

Most of the boys joined their herds and moved away in groups of three or four, but Simba started out alone. Some of the boys called to him to ask that he go with them, but he shook his head. He liked to play the games of the village with his friends and did not ordinarily like to be alone, but this guarding of his father's property was a new and great responsibility. With the other boys, he might not watch closely, and a hyena could kill and carry off one of the young calves. So he preferred to be alone and run no risk of neglecting his herding.

Simba walked along behind his herd of some twenty humpbacked cows, with three or four calves tagging at their mothers' heels. He drove the animals toward a long slope of sun-drenched hill a mile distant. From the top of it he would be able to look to the northward over the plains and forest strips while his cattle grazed in plain view before him.

Arrived finally at the hilltop, Simba sat down in the grass, his spear beside him. The animals fed close to him in little groups down the slope. Sitting there,

Simba looked out over the land he knew so well. Partridges rustled through the grass about him. The plains were dotted with feeding game. At his left a few yards, tiny gazelles frisked on the hillside. Far below, at the edge of the jungle that bordered a stream, five giraffe moved majestically along the forest background, where great clumps of scarlet flowers flamed against the green leaves. Simba's eyes took in all this in a sweeping glance, coming to rest again on the feeding cattle. With special fondness he watched Madoadoa, the spotted cow, and her calf. The little creature was only five days old. Simba loved this calf more than anything else. It was his very own, presented to him by his father the day it was born.

Simba lay back on his elbow and watched Madoadoa and her calf. Perhaps it was because his stomach was full of *posho*, a finely ground corn meal, or it may have been the warmth of the sun and the coolness of the grass roots, but at any rate, the truth must be told that Simba's head nodded and he fell asleep. He had not slept long when he woke suddenly, ashamed that he had failed in his duty. Suddenly he was aware, with the feeling of all wild creatures, that he was not alone. He rose in a single graceful movement and whirled, the slender spear in his hand. There, just behind him stood old Kibeti, the dwarfed cripple who was the storyteller of the village. His hollow black eyes fixed the boy sternly. Ashamed, Simba sat down. Kibeti limped forward and sat beside him.

"So, lazy one," grunted the old man, "you sleep while guarding your father's cattle. Had I been a lion



I could have killed you, and killed that worthless Madoadoa as well."

"I am sorry, Kibeti," replied Simba. "I deserve to be eaten by a lion. Perhaps you will tell my father and he will beat me." He eyed Kibeti anxiously.

"This time I will not tell him. You are young, and it is hard for the young to sit still through the long day. To sit without sleeping, here in the sun, is hard for a boy. Perhaps I should say it is hard for a child, because a boy who would be a hunter and a warrior would not sleep."

Simba's cheeks burned with shame, for he knew that there was justice in what Kibeti said. "Oh, Kibeti," he said miserably, "I know well that what you say is true. If the warrior who sits by the village

night fire should sleep, then enemies could enter our village and spear us on our mats where we slumber. I will never sleep again when I should stay awake."

"That is well and as it should be," said Kibeti. "I want to speak to you of duty," he continued. "There is the duty of the hunter who follows a long hard trail so that his people may have meat. There is the duty of women, they who cook and raise our crops, of the warrior who watches and sleeps not, lest enemies come in the night. And then, too, there is the duty of the boy who watches his father's cattle. He must not sleep. Now me, I never sleep except at night. Old though I am, I never—I never—" Kibeti's voice trailed away and stopped. His head nodded and the aged body grew limp. He slept.

It was very still there on the sunny hilltop. Simba smiled and looked at Kibeti as he slept, noting the gray color of his wrinkled skin where ashes from his fire clung to it. He looked at the twisted, broken body and thought of the elephant who had made Kibeti a cripple. Simba made a note in his mind to ask for the story some day soon. It was one that Kibeti had never told. Thinking of these things, the moments passed until Simba remembered the cattle. He looked the herd over carefully.

All seemed to be well. Scattered down the gentle slope of the hill, the beasts grazed quietly. All of them except Madoadoa and her calf were within safe range. She, however, had wandered farther down the hill apart from the rest. Beside her, the calf was still fumbling for his dinner. Simba watched the two, try-

ing to decide whether or not he should go after her and drive her back with her companions. As he watched, his eyes suddenly became slits and his head shot forward. Showing above the grass some thirty feet from Madoadoa and her calf were two black spots. They were about a foot apart. Now Simba knew that two such motionless black spots as these were not a natural part of the landscape. He instantly knew what they were, and his heart beat hard with fear. He was looking at the black tips of a lion's ears. The lion was carefully stalking Madoadoa, and the calf that Simba loved. It would be only a matter of a short time now—when Madoadoa had fed a bit closer to the crouching lion—that a loud snarl would shatter the peace on the sunny hillside and a brownish-yellow shape of death would hurl itself from the grass upon Madoadoa and the calf. She and the little one would be killed.

Only the whisper of wind through the grass and the soft breathing of Kibeti broke the silence. Simba sat there in the clutch of paralyzing fear. If he moved and the lion saw him, would the great beast attack him? If he stepped between the lion and the cattle, then would the lion charge him in a swift, awful rush? Would he go down under the lion's spring, down with a scream as great claws ripped the flesh from his bones and long fangs met in a crushing bite at his backbone? All these questions flashed through Simba's mind and fear kept him crouching there, frightened and trembling.

Just then the calf bawled softly. Simba glanced at him and his mother. They were now a little closer to

those two black spots at the grass tops. Any instant now it would happen, here before his eyes. Then as he looked at the cow and calf a great love for them brought a mist to his eyes. And at that instant, when he stopped thinking of himself and his own fears and thought of his love for those two so close to death, some of his fright left him. He poked Kibeti, grasped his little spear, and rose to his feet.

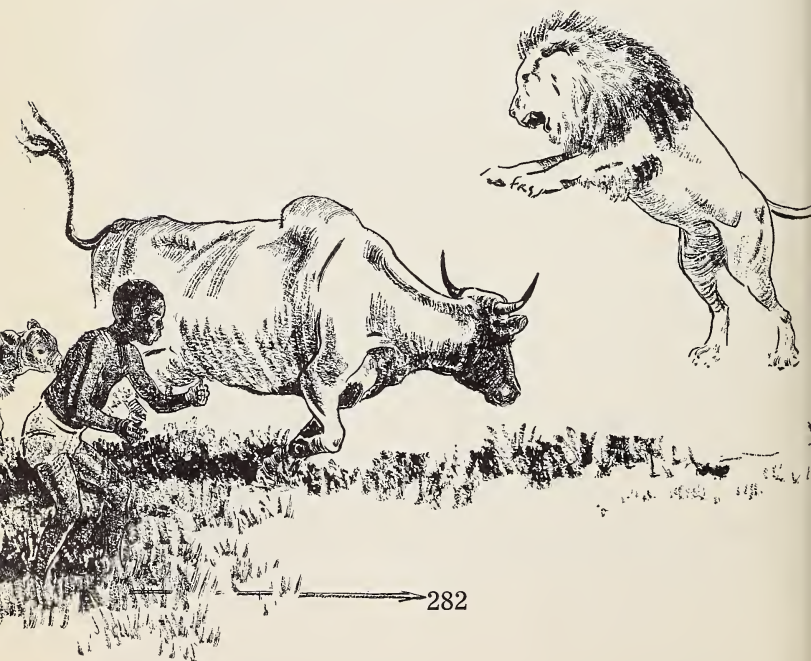
The old man got up and stood beside him. At once he saw the danger. "Down, Simba," he whispered. "Down, or we too will die."

"No, Kibeti, I am going forward," cried Simba. "Have I not my spear?" He raised the slender weapon above his head.

As his voice broke the silence, Simba stepped forward. Unarmed and afraid, the ancient warrior went with him. Side by side these two, the shuffling crippled one and the slim brown boy, advanced toward Madoadoa. Simba shouted bravely, although his voice shook a bit. His legs trembled, and there was a strange shaking in the pit of his stomach.

The instant Simba's voice rang out, the lion stood up from the grass. He knew he was discovered, and he growled deeply in his throat. Madoadoa now saw the danger that threatened her and her calf. If in the past few days she had appeared to be a poor sort of mother, she made up for her sins in this moment. Swiftly she pushed the calf behind her. Her eyes rolled with terror, but she stood firm between her calf and the lion, horns down, ready to give her life for the little creature trembling in terror behind her.

Simba advanced steadily. The lion, at sight of these human enemies, bared his fangs and crouched to face them. Less than forty feet now separated the man and boy from the great beast before them. It was close enough. Simba halted, placed the shaft of the spear under his right arm, advanced the sharp tip, and braced himself. Lower the lion crouched and dropped his shaggy head. It was the sign of a charge. In that moment Simba knew for certain that the spear would break under the force of the lion's spring, knew that he was going to die, he and old Kibeti, there on the green grass. The lion snarled, and Simba saw the mighty muscles gather themselves for the spring.



At this moment Madoadoa let go a furious bellow, put down her head, and charged at the lion. It was so unexpected that Simba dropped his spear. The lion may have remembered suddenly that the scar on his shoulder had come from the daggerlike horn of a mother eland, a great cowlike antelope. Perhaps a quick memory of the pain of that old deep wound flashed across his mind. At any rate, his savage form lifted in a mighty leap and he hung for a moment in arched splendor against the sky. When he came down to earth, he turned in a flash and went off down the hill in long bounds to disappear in the forest below. Madoadoa stood, shaking her horns, and bawled defiance after the fleeing lion. The calf, now over his fright and quite unaware that his mother had narrowly escaped committing suicide, was feeding happily. Kibeti and Simba sat down and laughed until tears came to their eyes. Through the afternoon Simba watched the cattle, and when the long shadows drew across the plains from the mountains, drove them back to his village.

That night the tale was told by Kibeti, and all the people heard it. Warriors looked at Simba with interest, for they knew he would some day be a great one among them. The boys with whom he played looked too, and with a respect they did not quite understand. If Simba's chest swelled a bit and if there was a slight strut to his walk that night, he must surely be forgiven. After all, the thing he had done had taken the courage of a man and a warrior.

Alden G. Stevens

Pictures Help You to Read

At the end of this lesson are eight pictures. Some of the pictures show how wind, rain, snow, and running water have worn away the land in places where men have cut off the forests and plowed up the grasses and other plants that once grew there. This wearing away of the land is called soil erosion. Other pictures in the lesson show what can be done to prevent soil erosion and to build up the soil in those places where great damage has already been done.

Each picture illustrates an important fact in one of the paragraphs in this lesson. These paragraphs are numbered 1 to 8. Number your paper from 1 to 8. Read the first paragraph. Then find the picture that illustrates it. Opposite 1 write the letter that you will find in a lower corner of the picture. Do the same for each of the other paragraphs.

1. The trees of a forest make a roof that causes the rain to fall gently upon the soil beneath them. After striking the ground softly, the water runs slowly over a thick, matted covering of decaying leaves and twigs. This thick covering keeps the water from running swiftly and, before it has gone far, much of the water has soaked into the soil. The roots of the trees hold the soil in place so firmly that slow-moving water is unable to move it. On the steepest slopes trees slow down the speed of running water and hold the soil in place. Millions of acres of land are protected by trees in these ways.

2. Grass also helps to prevent soil erosion. Its roots bind the soil in place and open tiny passageways for water to seep into the soil. Its blades and stalks prevent hard rains from pounding the soil loose and carrying it away. Neither man nor nature has found a better protection against waste of soil and water than a thick matting of sod over the ground. Little water runs off grassy pastures, and little soil washes away from them. Meadowlands are well protected by their grassy coverings. Grass-covered hillsides allow extra rainfall to flow slowly and harmlessly downhill to streams.

3. To grow crops, farmers must plow up the soil. Many crops, such as corn, tobacco, and cotton, must be planted in rows, and the furrows must be cultivated to keep them free of weeds and grass. These cultivated fields invite soil erosion. When it rains, water washes along the furrows and takes the rich, loose topsoil with it. If the furrows run up and down hill, they become gutters that speed the flow of the water, with its load of topsoil, and allow it to dash swiftly from the fields above to the streams below. Unless something is done to stop the rapid flow of water, soil erosion is increased. The furrows grow into gullies, which become wider and deeper with each heavy rain.

4. On slopes where trees have been cut off, where grass is plowed up, and where the land lies bare, rain stirs up the unprotected soil. During heavy showers, muddy water flows swiftly down the slopes. Little water soaks into the soil. As the water runs downhill, it cuts small gullies that grow larger and larger with each rain that falls. Water dashing down the gullies carries

the rich topsoil from the land it drains, leaving it less and less valuable for growing crops. Unless something is done to fill in the gullies or to prevent their growing larger and larger, the land becomes unfit for farming.

5. After the rich topsoil is washed away and gullies have formed, the land is less and less useful for farming. There is nothing to slow up the flow of water and let it soak into the ground. The farmers living on land that is badly eroded often become discouraged because they cannot make a living for their families. Many of them move away from their ruined farms. A bulletin of the United States Department of Agriculture states that fifty million acres of land in the United States have been ruined by soil erosion.

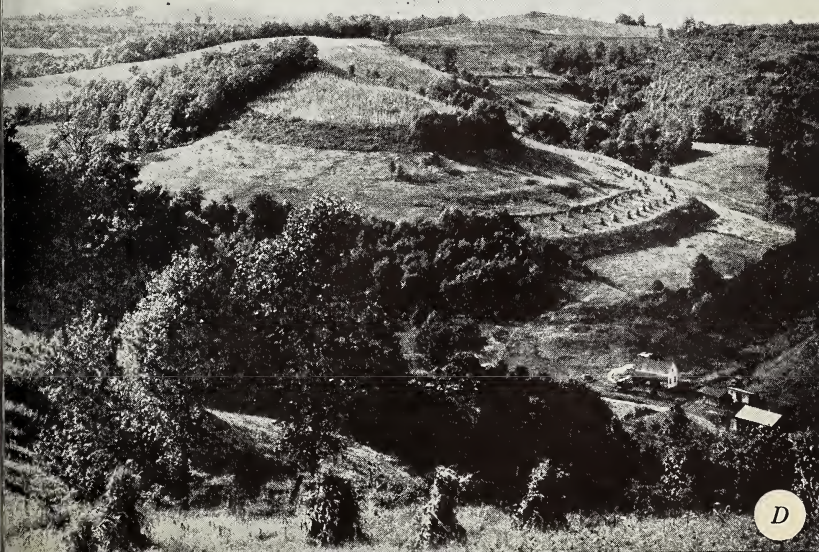
6. One of the best ways to prevent soil erosion is to plant crops in rows around hills, and never up and down them. Such planting is called contour farming. Furrows around the contour, or slope, of hills become little dams to hold rainfall on the land until it soaks into the soil. By this holding back of the water, the soil is kept from washing downhill, and no gullies are formed. Experiments have been carried out to show the value of contour farming. On one Iowa farm a field of corn with rows up and down hill lost one tenth of the rainfall during a three-year period and forty tons of soil per acre. A cornfield on similar land, farmed by the contour method, lost one thousandth of the rainfall and no soil.

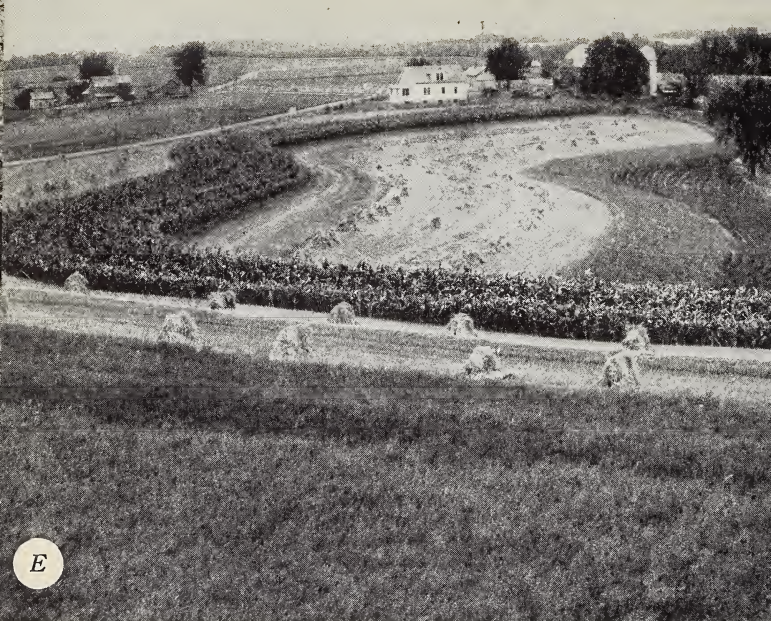
7. Strip cropping is one kind of contour farming that is especially valuable in preventing soil erosion. To strip crop, the farmer plants bands, or strips, of

close-growing cover crops, such as wheat, grass, and clover, around the contour of the land. Between the strips of cover crops, he plants strips of cultivated crops, such as corn, tobacco, or cotton. The cultivated crops cannot hold all the water, even when the furrows are plowed on the contour, but the muddy water that washes down from cultivated strips is slowed up by the strips of cover crops. The topsoil carried by the water is left when the water soaks through these strips. Besides helping to stop soil erosion, the roots of such cover crops as clover and alfalfa produce valuable food for the soil. An experiment in Texas showed that a field of cotton lost one fifth of the rainfall and fifty-two tons of soil per acre. A similar cottonfield, strip cropped, lost less than one tenth of the rainfall and five tons of soil per acre.

8. Even on rough, hilly farms, crops can be raised if the soil is protected from erosion. Trees can be planted where gullies are likely to form and where the land is too rough to be used for growing crops. Strip cropping on the contour can be carried on where the slopes are not too steep. In places where the water drains off, grass can be planted to slow up the speed of the running water and to prevent the soil from washing away. Small dams can be made where gullies have already formed. Dams hold the water that flows into the gully so that it can be used to irrigate the surrounding land in dry weather, or to furnish water for livestock. With proper care to prevent soil erosion, farmers can make a living for their families even on hilly land.









A Soil-Erosion Map

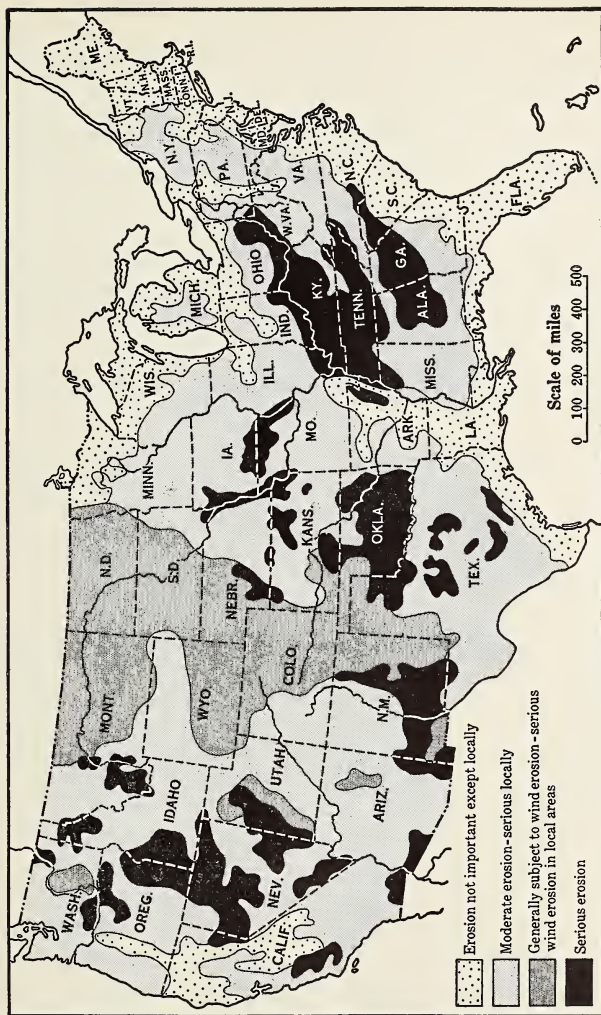
The pictures on pages 288 to 291 show how soil erosion destroys the land and how such destruction may be prevented. They do not tell, however, how much land in the United States is affected by erosion or where the badly eroded areas are.

How can people be helped to see and understand how much damage has been done by soil erosion? When this information is put on a map they can see very easily the places in which erosion is a serious problem, those in which it is moderately serious, and those where it is not serious at all. Such a map was planned for the people of the United States by the Department of Agriculture. The information was collected, and the map that you see on page 293 was made.

Studying the key will tell you what the map means. In the areas that are marked with widely spaced dots, there is little or no erosion. The areas where erosion is most serious are shown in black. The areas that are light gray are moderately eroded. A darker gray indicates the regions that are subject to wind erosion, which is serious in certain areas.

The land that is moderately eroded has not been greatly damaged, but the land that is seriously eroded is almost or entirely destroyed for farming.

Turn again to picture *A* on page 288. Think about the facts that it illustrates. Then by studying this picture and the map on page 293 suggest a region in which the picture might have been taken. Where might picture *B* have been taken? picture *C*?



Can You Answer These Questions?

Use the map on page 293 to help you answer the following questions:

1. In what regions is soil erosion not serious? How can you find these regions on the map? Suggest reasons that explain why soil erosion is not serious in these places.

2. Can you name rivers along which there is serious erosion? You may need to use the map of the United States in your geography to find the names of these rivers.

3. Which states are generally subject to wind erosion?

4. Locate the corn belt on this map. Is there much erosion in the corn belt? In what parts of the corn belt is erosion most serious?

5. Which states seem to be suffering but little from erosion?

6. In which states is there serious erosion?

7. Is all the land in some of the states suffering from moderate or serious erosion? Which states?

8. Is any state east of the Mississippi River seriously affected by wind erosion?

9. How serious is the erosion problem in the region around the Great Lakes?

10. At the Canadian border, about how many miles wide is the region that is subject to wind erosion?

Using the facts that you learned from the map on page 293, make several statements to prove that erosion is a serious problem in the United States.

The Birds' Compass

How do birds find their way over thousands of miles of trackless ocean? Many scientists think that in addition to the senses that we have—sight, hearing, smell, taste, and touch—birds have another sense—the sense of direction. It is by means of this sense of direction that birds find their way on long journeys.

In "The Birds' Compass" Mr. Frank M. Chapman describes several experiments that were made to find out whether or not birds do have a sense of direction. As you read each experiment, find on the map on page 300 the cities, islands, and waters that are mentioned, and trace with your finger the route over which the birds flew. Choose one of the experiments for a class report. When you have finished reading the lesson, turn to the directions on page 301.

Have you ever been in a small boat offshore in a fog? It is not a pleasant experience. You venture out on some fine, clear day, when suddenly a bank of fog comes creeping in from the sea. Almost before you see it, softly, silently, swiftly it surrounds you. The shore becomes dim and soon disappears. Probably you have no compass, and unless a fog siren, the wind, or the tide gives you a clue, you may soon be quite at a loss to say where the land lies.

Then you will be fortunate if somewhere near by there is a nesting colony of sea birds. If some of these birds also had gone out to fish at sea, when the fog came what would happen to them? The roar of the siren could mean nothing to them. I doubt if they

would notice the direction of either wind or tide. Nevertheless, bird after bird would go swiftly through the fog, returning just as surely as though its home could be seen distinctly. Then if we were wise, we would set our course by the birds and reach land in safety. So the birds would then be our compass.

For many years men have been trying to discover how birds find their way. In the experiment which I am about to describe we knew that the birds used had never before made the journey from the place where they were released to the place from which they were taken. The experiments were planned by Professor Watson of Johns Hopkins University. The birds used were sooty and noddy terns. Many thousands of these birds nest on Bird Key, one of a group of tiny islands that lie southwest of Florida. In order that he might study their habits, Professor Watson lived alone on the Key with them for three months.

Birds which know nothing of man generally have little or no fear of him; so Professor Watson soon made friends with the terns of the island. He could go among them and cause no more alarm than one would in walking through a poultry yard. This tameness permitted him to learn many interesting things about their lives at home. He also made a number of tests to see whether birds which were taken some distance away would return to the island.

He caught several birds and stained their feathers various colors in order that he might recognize them. First, he took some noddies. A few were set free only twenty miles, others sixty miles, from the Key. All



*The picture above shows a pair of noddy terns.
The one below shows a sooty tern*

Herbert K. Job





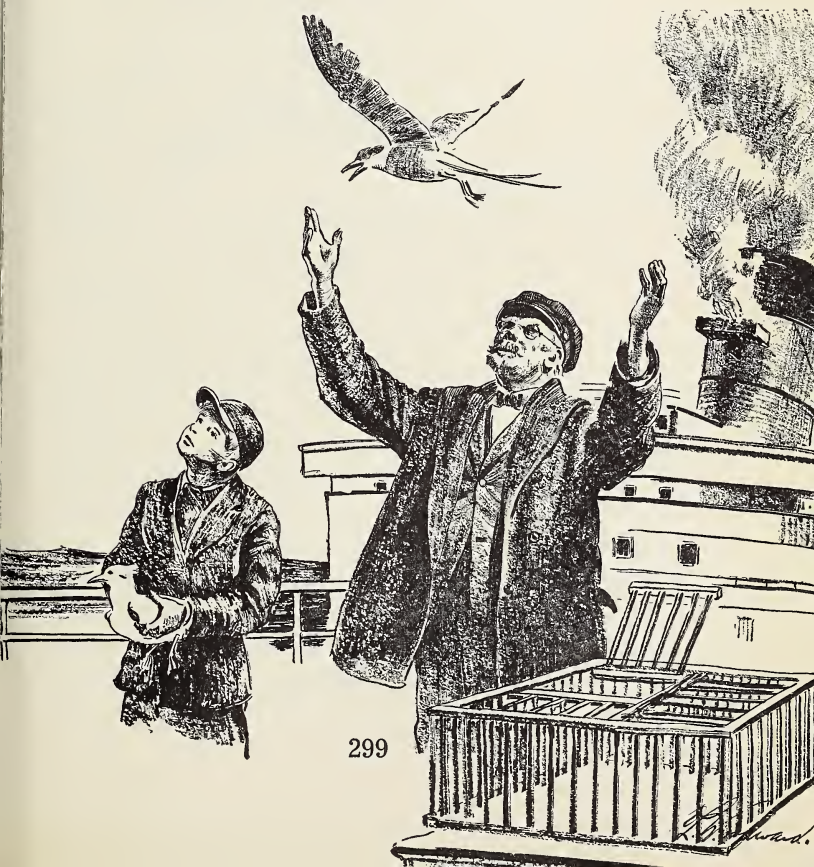
returned within from one and three quarters to about three and a half hours after being given their freedom.

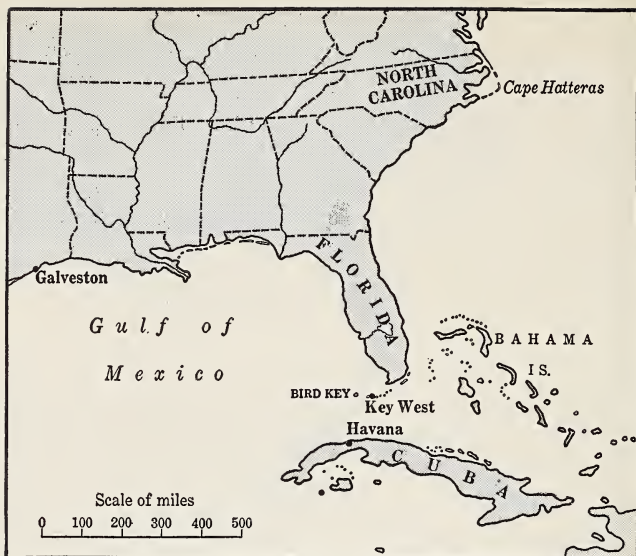
Then two noddies and two sooties, after being colored, were sent to Havana, Cuba, a distance of one hundred and eight miles. They were released on the morning of July 11, and they returned to the Key the next day. It may be said that these birds had flown over this route before, but in the next test the birds used were taken on a voyage over a part of the sea about which they could have known nothing.

On June 13 three noddy and two sooty terns were caught and marked, and sent from Bird Key to Key West. Here they were placed in the hold of a north-bound steamer. They were carefully fed and watered, and on June 16 they were released about twelve miles east of Cape Hatteras (hăť'ěr às), off the coast of North Carolina. This is about one thousand and eighty miles by water from Bird Key—a long journey even for the most highly trained homing pigeon. But the birds' compass pointed the way, and on the morning of

June 21 both sooties were found on their nests, and one of the noddies was seen several days later.

Still we might say, as someone indeed suggested, that these birds simply followed the coast line until they reached their island home. Though why they should go south from Cape Hatteras instead of north, or turn westward through the Florida Keys instead of eastward to the Bahama Islands, where many terns of their kind live, is not explained.





However, to make it perfectly clear that the birds were not guided by landmarks of any kind, Professor Watson finally sent several sooty and noddy terns across the Gulf of Mexico to Galveston, Texas. This city is distant eight hundred and fifty-five miles from Bird Key, and the water lying between is unmarked by island, shoal, or reef. Nevertheless, one of the birds returned to Bird Key in six, one in seven, and a third in twelve days from the time of release.

It is, therefore, almost certain that the birds used could not have been familiar with the route; nor could there have been other birds of their kind to guide them. From the hold of the vessel they certainly could not have seen the water over which they were sailing, and

if they had, it would not have given them a clue to a return route. We can, therefore, explain their remarkable feat only by believing that they were guided by what we call the sense of direction.

No other experiments that I know of seem to prove more clearly than these of Professor Watson that birds have this sense.

Frank M. Chapman

How to Report an Experiment Accurately

It is important to report an experiment carefully or you may give a wrong idea of it. Study the experiment that you chose, using the following outline as a guide in planning your report. If there is a wall map on which you can show the routes over which the birds flew, plan to use it in giving your report.

Points to be brought out in the report of an experiment are:

1. *The purpose of the experiment.* Tell clearly what the person who made the experiment was trying to find out.

2. *The method of the experiment.* Tell exactly how the experiment was carried out. Report all the details accurately.

3. *The result of the experiment.* Tell exactly what happened when the experiment was carried out.

4. *The conclusion.* Tell what the experiment seemed to prove. If some people felt that the experiment did not prove what it was supposed to, tell why.

Working with the Index of This Book

Can you use the Index of this book to find answers to the questions which are listed below? You will have to do these things:

1. Read the question and decide which is the important word to look for in the Index.
2. Turn to the Index and quickly locate the word.
3. Decide which page of the book will probably give the answer to the question.
4. Turn to the page and skim it until you find the key word.
5. Read carefully to find the answer. If you do not find it, try another page listed in the Index.

QUESTIONS

1. Who invented dynamite?
2. How did the Aztec Indians dress?
3. What things cause spontaneous combustion?
4. What are the sources of the world's supply of salt?
5. What kinds of work are done by circus elephants?
6. What was the source of the great wealth of the city of Tenochtitlan?
7. Who is the Dalai Lama?
8. How high is the Empire State Building?
9. Where did the first automobile race in America take place?
10. What are two causes of soil erosion?
11. What are commemorative stamps?

Using the Index to Answer Several Questions about One Subject

The questions on this page are grouped about three subjects. Use the Index to find the answers.

A

1. How many letters went to the dead-letter office in a recent year?
2. What slows up the work of the men who sort the mail?
3. Which abbreviations cause most trouble for the men who sort the mail?
4. What form for addressing envelopes is given out by the Post Office Department?

B

1. In what ways were the original forests of the United States destroyed?
2. In what ways do insects harm the forests?
3. What is meant by reforestation?
4. What animals are pastured in the national forests?
5. When were the forest reserves established?
6. How are the national forests used for recreation?

C

1. Which is the more destructive, gasoline or dynamite?
2. How should gasoline be stored?
3. Why is gasoline vapor especially dangerous?
4. Why should people not smoke while the fuel tank of a car is being filled?
5. Why should gasoline not be used for cleaning?

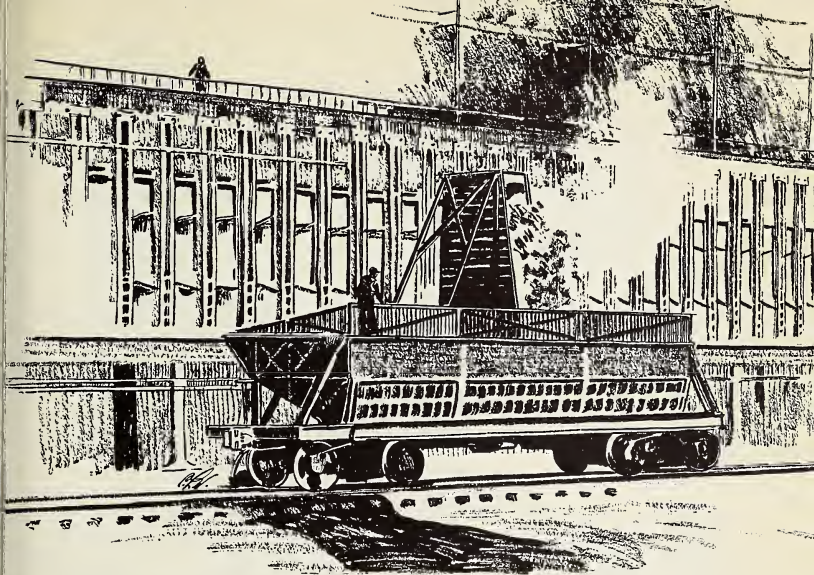
Coal-Tar Wonders

Suppose someone should ask you to name one material from which we get dainty perfumes and deadly explosives, fountain pens and flavoring extracts, phonograph records and paving tar. Could you do it? This same material probably perfumes the soap with which you wash your hands. From it are made the moth balls with which your mother sometimes packs away your winter clothing. Even the ink with which you write may be made from it. This useful material is obtained from something that almost everyone has seen. It is made from coal. It is called coal tar.

What is coal tar? How is it made? For what is it used? The article that follows will answer these questions.

You know that when coal burns in a stove or in a furnace only ashes are left. That is because the oxygen in the air has burned up the useful part of the coal. But coal is not burned up if it is heated red-hot in a closed oven where the oxygen in the air cannot get to it. When the coal is heated in such a closed oven, gases are driven off by the heat and a black, solid material called coke is left. Coke is used as fuel in the making of steel, and it is also burned in household furnaces.

When coke was first made it was the only product in which the makers were interested. The gases were allowed to escape into the air. Gradually ways of using these gases were discovered, and today they are almost as valuable as the coke itself. From these gases are obtained ammonia, gas that is used for cooking and



heating, and coal tar. These substances are called by-products, because they are obtained during the process of making coke.

The type of closed oven that is used to obtain both coke and these other important substances is called a by-product oven. This oven is equipped with outlet pipes through which the gases may be removed. The picture above shows a row of by-product ovens.

Coal tar, which is a black, sticky substance, was long considered a nuisance by the makers of coke and gas. It was oily and smelly and it clogged up the pipes; so the gas makers and coke makers washed it out and got rid of it as best they could.

But this evil-smelling "nuisance" has been found to be one of the most useful raw materials in the world. From it the chemist seems able to make almost any-

thing he wishes, from medicines to explosives, from dyes to disinfectants, from perfumes to cleaning fluids. Not all these products are contained in the coal tar itself. Only about a dozen simple, or primary, substances come from the coal tar, but from these the chemist is able to make thousands of new products.

Among the most important products made from coal tar are the dyes called aniline dyes. A whole rainbow of colors may be made. Indeed it is possible to make from this raw material almost any tint or shade desired. More than nine hundred different coal-tar, or aniline, dyes are in common use. These dyes are used for our dresses, ribbons, and hats, our Easter eggs and valentines.

Some of the aniline dyes have very interesting uses besides that of giving color. "Brilliant green," "crystal violet," "Victoria blue," and other dyes are used as antiseptics to keep wounds from becoming infected. One yellow dye is used as an antiseptic to cover burned skin. During the World War the patients in military hospitals were often "decorated like Easter eggs" with these antiseptics. The discovery of these new antiseptics obtained from coal tar made it possible to save the lives of many more of the wounded than was possible in earlier times.

In addition to their use as antiseptics, aniline dyes help to save lives in another way. They are used to color bacteria so that the bacteria can be seen and studied under the microscope. No other means of staining bacteria has proved so satisfactory as using aniline dyes. Without them many of the discoveries



Some of the many coal-tar products

that have aided our fight against tuberculosis and other diseases caused by bacteria would have been impossible.

A number of medicines and drugs are made from the products of coal tar. One drug that the dentist uses to deaden the pain in the gum when he pulls a tooth comes from coal tar. Various disinfectants that are used to kill germs are also made from this useful material. Many of these are on sale at drugstores under commercial, or trade, names.

It is a strange fact that the substance that gives us medicines for healing wounds also gives us the explosives that cause many of these wounds. Coal-tar products are used in making both an acid with which bombs are filled and a powerful explosive, called T.N.T.

This same coal tar furnishes us with flavoring extracts. It gives us many cheap perfumes and an oil that scents much of our toilet soap. Saccharin, a substitute for sugar, which is about five hundred times as sweet as cane sugar, is obtained from coal tar.

One of the newer products made from a coal-tar product is bakelite. It is a resinlike material that can be put into a mold, or hollow form, and pressed into any shape desired. After it is heated, bakelite becomes very hard and as smooth as glass. It is waterproof and is not affected by heat, water, gases, acids, or electricity. These qualities make bakelite useful in building electrical machinery.

Wood, paper, cardboard, cloth, and sawdust are soaked in solutions of bakelite and changed by heat and pressure into tough and hard materials. From



All or a part of each of these articles is made of bakelite

these materials ash trays, airplane propellers, telephone mouthpieces, and many other things are manufactured.

By a different process bakelite may be made into a material colored like amber, but stronger and more brilliant than amber. It is used in the making of such articles as pipestems, beads, and umbrella handles. Fountain pens made of it are transparent, so that one can see how much ink is in the pen. New uses for bakelite are being discovered all the time. Do you know of uses that this article does not mention?

Another coal-tar product is used for making phonograph records, buttons on United States navy uniforms, and frames for eyeglasses. Some other coal-tar products are creosote for preserving lumber, tar for roofing, tar paper, and paving materials.

Besides the articles that you have read about, thousands of other things are made from what was once a waste product of coke. Coal tar has made it possible for us not only to have many new products but also to enjoy many things that were formerly too expensive for common use. Medicines and drugs, dyes and perfumes that once cost hundreds of dollars a pound may now be purchased for a few cents a pound. A writer in the English magazine *Punch* sums up the value of the black, smelly, sticky substance called coal tar in this rhyme:

Oil and ointment, and wax and wine,
And the lovely colors called aniline;
You can make anything from a salve to a star,
If you only know how, from black coal tar.

Can You Explain New Words and Phrases?

Having read the article about coal-tar wonders, you should be able to explain briefly each of the words and phrases given below. If you cannot give a clear explanation of each of them, turn back to the lesson "Coal-Tar Wonders" and find out about them.

coal tar	by-products	saccharin
coke	antiseptic	by-product oven
T.N.T.	bakelite	creosote

gases given off when coal is burned in a closed oven
products made by chemists from primary substances

Summarizing to Support the Truth of Statements

At the bottom of the page are two statements about coal-tar products. Write two summary sentences that support the truth of each. Read first this example:

Coal-tar products are used both to cause and to heal wounds.

a. The powerful explosive T.N.T. and an acid used in filling bombs are made from coal tar.

b. Antiseptics, medicines, and drugs are made from coal-tar products.

Now make two summary sentences that support the truth of each of the following statements:

1. Coal tar has made it possible for us to enjoy many things that people of earlier times could not enjoy.

2. Aniline dyes are used for other important purposes besides that of giving color to clothing, food, and other manufactured articles.

The Story of Dyes

Have you ever stopped to think how much we all enjoy color? We like pink roses, yellow daffodils, and the glowing colors of the sunset. We like blue books, red sleds, and green balloons. And we like to see in our clothing all the lovely colors of the outdoor world.

Perhaps no other use of color is more important to us than that of making our clothing interesting. How dull clothes would be if all brown suits were the same shade of brown; if all blue dresses were exactly the same shade of blue!

Where do we get the dyes that make our clothing red, blue, green, brown, and many other colors? The story of dyes is told in this lesson. As you read, try to find answers to the following questions:

I. How was clothing dyed in ancient times?

II. What new dye materials were found in the New World?

III. Where did the colonial housewife in America get the colors with which she dyed the yarn that she spun and the cloth that she wove?

IV. What changes have the artificial dyes of today made in the dye industry?

Dyeing is one of the oldest of the arts. Even in savage times man colored his clothing with dyes that he obtained from plants. At first these colors probably faded very quickly, for they were merely the juices of fruits, leaves, and flowers.

In time, methods of making the colors lasting, or fast, were discovered. Then the art of dyeing really began. It was well understood centuries before Christ was born. Some of the methods and materials used by the ancient Egyptians are still in use today. Although many dyes were made from plants, animals, and minerals by peoples of long ago, dyes that gave bright, beautiful, and lasting colors were few in number and very expensive.

A thousand years before Christ the city of Tyre (tīr) became famous for Tyrian (tīr' ī ān) purple, the most precious of all ancient dyes. Tyrian purple was not always purple. It was sometimes violet or a bright crimson. It was used to color the robes of the princes of Tyre and Greece, and later those of Roman emperors.

Tyrian purple was made from shellfish found in the Mediterranean Sea. A drop of thick, whitish liquid, smelling like garlic, was obtained from a tiny bag, or sac, behind the head of this fish. The liquid, when spread upon cloth and left uncovered in the air and sunlight, turned first green, next blue, then purple. If the cloth was washed with soap, the color became a crimson that would not fade.

It took thousands of shellfish to make a small quantity of dye. For this reason the dye was so expensive that only kings and very wealthy people could wear robes of Tyrian purple. At one time a Roman emperor fixed the price of wool dyed with Tyrian purple at three hundred and fifty dollars a pound. Linen that was crimsoned with this rare dye cost six hundred dollars a pound.



Another much-prized ancient dye was indigo, a beautiful, fast, blue color made from the indigo plant. In the tombs of Egyptian mummies are found wrappings of cloth dyed with indigo, which have kept their bright-blue color unfaded through the centuries. Indigo and many other of the best dyes came from India.

The use of the madder root to dye cloth Turkey red was known from early times. Cloth dyed red with madder has also been found in the tombs of Egyptian mummies. Originally the madder plant was cultivated in India and in southern Asia, but it was later introduced into France and Holland, where it was grown with profit. It was also grown in America in colonial days.

The discovery of America gave the world new dyestuffs, a number of which were made from the wood of tropical trees. Logwood and brazilwood were among the most important of the dyewoods. The bark and sapwood of the logs were scraped off, and the heartwood was shipped to market in large blocks. Combined with other substances these woods made yellow or red.

The Spanish explorers found the natives in Mexico and South America making a crimson dye from the bodies of tiny insects that live on certain kinds of cactus plants. This dye, which is called cochineal dye from the name of the insects from which it is made, was introduced into Europe by the Spaniards and became an important article of commerce.

Other dyes have taken the place of cochineal in the making of cloth, but it is still used to color candies,

medicines, and certain foods. Today there are in Peru, Mexico, and the Canary Islands large plantations where the cochineal insects are cultivated as carefully as silkworms are in other countries. Only the female insects are used to make the dye. The insects are brushed from the branches of the cactus into bags and killed by being dipped into hot water or put into a hot oven. They are later dried thoroughly and ground to a powder. It takes seventy thousand of the dried insects to make a pound of dye.

In colonial times in America, each housewife dyed the yarn she spun or the cloth she wove. For her colors she depended for the most part upon the trees, flowers, and vegetables that grew in the neighborhood. Pokeberry juice boiled with alum gave a beautiful crimson. Sweet-apple bark and sassafras bark, the flowers and leaves of the balsam tree, and a number of other flowers, barks, and roots were used for dyeing cloth orange and yellow. From the bark of the red oak or hickory were made pretty shades of brown. Onion skins or walnut shells also dyed materials brown.

A number of bright colors were obtained from flowers. The petals of the iris gave a delicate light-purple tint to white wool. Juice pressed from the flower of the goldenrod and mixed with indigo made a lovely green. A good black was made by first boiling woolen cloth with leaves of the common field sorrel, and then boiling it a second time with logwood and other materials. A black made from the leaves and berries of the gallberry bush was much used by people who made hats.

Only a few dyes had to be purchased by the colonial housewife. The leaves, bark, flowers, and roots that she gathered, and the madder that she raised in the kitchen garden, gave her most of the colors she used. Of the few dyes that were sometimes purchased, logwood and indigo were the most important. Blue was the favorite color, and this was obtained from indigo. So popular was this dye that peddlers traveled around the country selling it.

In most countries today the housewife no longer dyes her yarn or cloth, just as she no longer spins and weaves. All these processes are carried on in factories. Factories do not depend upon trees and flowers for their colors as did the housewife, nor do they make much use of the natural dyestuffs so prized by weavers a century ago. The dyes used in the modern factory are made from coal tar and are called aniline dyes.

Aniline dyes were discovered by accident in 1856. William Perkin, a lad of seventeen or eighteen, was trying to prepare artificial quinine in a laboratory that he had set up in his father's attic. A black, tarry mess was the result. In disgust young Perkin washed out the tar with alcohol and found, to his surprise, that it gave him a beautiful purple liquid. After repeating the experiment many times he was again able to get the lovely purple color and to perfect a process for making it. This was mauve, the first color to be made with aniline dye.

Aniline dyes have brought about great changes in the dye industry. Although they were not discovered until after the middle of the nineteenth century, they

have already taken the place of almost all the old dyes, many of which had been in use for centuries. Before chemists discovered that dyes could be made from coal tar, people had to depend upon plants and animals for their colors. To obtain them, they robbed nature in all parts of the world.

Since the discovery of aniline dyes, it is no longer necessary to depend upon nature for colors. In 1897 nearly a million acres of land in India were growing indigo; today only a few hundred acres of indigo are planted. Before the discovery of a coal-tar substitute for madder, France produced half-a-million tons a year; today other crops are planted in the madder fields of France. All the colors that were made from



natural dyestuffs can be produced much more cheaply from coal tar. A hundred years ago indigo cost four dollars a pound; in 1912, after the process for making artificial indigo was perfected, indigo cost about fifteen cents a pound. The precious Tyrian purple that only princes and emperors could afford to wear can now be made so cheaply from coal tar that anyone can wear the royal color.

The use of coal tar has not only made it possible to obtain colors more cheaply, but it also has given us lovely new shades and tints that could not be obtained from natural dyestuffs. A small number of dyes, and these often dull and uninteresting, were prepared from natural dyestuffs; a thousand dyes of every possible shade are built up from coal-tar products, and many more are possible. Besides, the aniline dyes contain fewer impurities and are thus more dependable than dyes obtained from plants and animals.

Another reason why the coal-tar dyes are valuable is that they give colors that can be used with various kinds of materials. Dye acts in different ways on different materials. Some dyes that will color one material will not color other materials. Silk and wool are more easily dyed than cotton and linen. Cloth that is made of two materials, such as cotton and wool, cannot be dyed at one operation, but must be put through two dyeing processes.

The manufacture of coal-tar dyes became an important industry in the United States during the World War. Before that time Germany had produced the greatest amount of these dyes. When the war cut off

the German supply, dyes that had cost a dollar a pound quickly jumped in price. One keg of dye that ordinarily cost fifteen dollars was sold for fifteen hundred dollars. Then American manufacturers began to make dyes. Now the United States not only supplies its own needs but also exports more dyes than it imported before the war.

More than half the dyes that the United States manufactures and imports are used by the textile industries. The leather, paint, paper, and ink industries use most of the remaining part.

Can You Use Detailed Questions to Check Your Knowledge of Main Questions?

You have just read "The Story of Dyes" in order to answer four questions:

- I. How was clothing dyed in ancient times?
- II. What new dye materials were found in the New World?
- III. Where did the colonial housewife in America get the colors with which she dyed the yarn that she spun and the cloth that she wove?
- IV. What changes have the artificial dyes of today made in the dye industry?

It is not likely that you will be able to give complete answers to these questions from a single reading of the lesson. The detailed questions listed on page 321 will help you to answer the four main questions. Study these detailed questions in the following way:

a. Answer the first question as well as you can without looking back at the lesson. Do not write the answer.

b. Read again the part of the lesson that answers this question to see if you answered it correctly.

c. Decide under which of the four main questions this question belongs.

d. Study each of the fourteen questions in the same way.

e. When you have finished, plan an oral report in answer to one of the four main questions.

QUESTIONS

1. What were the first dyes with which man colored his clothing? How satisfactory were these dyes?

2. How old is the art of dyeing?

3. What was Tyrian purple?

4. In ancient times what was used to dye cloth blue? Turkey red?

5. What dyewoods were found in America?

6. How is dye made from the bodies of tiny insects? For what is this dye used today?

7. From what materials could the colonial housewife obtain each of the following colors: crimson, brown, green, black, orange and yellow, light purple?

8. What dyes did the colonial housewife buy?

9. What are aniline dyes?

10. How were aniline dyes discovered?

11. What change in the production of natural dyestuffs has been made by aniline dyes?

12. For what reasons have aniline dyes replaced those made from natural dyestuffs?

13. How did the World War affect the dye industry?

14. Which industries use most dyes?

The Hudson's Bay Company Post

Danny and his sister Prue live on the cold windy coast of Labrador. Danny, who hopes some day to be a true Labrador man, a trapper like his father, has caught a fox in his trap. He is allowed to go with his father to the trading post to sell the skin. The following pages tell the story of the journey.

Danny felt like a real trapper when, two cold sunrises after the day on which he had caught the fox, Father got him up at dawn. They had to see that the six rabbits and the ten partridges they had shot the day before were ready for Mother to cook, that the water buckets were full, and that dry wood was piled high beside the stove.

How happy Venture was to be free! His great bushy tail curved like a waving plume over his black-and-white back. His pointed ears stood up straighter than ever, as if to ask, "When do we start?" Foxie and Bruce and Huskie and Queen were happy, too. Rushing about, making great circles in the snow, they looked like wolves at play. They were almost as big as wolves and could fight as hard. Venture was the biggest, though—over six feet long from the black end of his pointed white nose to the white tip of his curving black tail. He let his mother, Foxie, lead the team, but no one dared forget that he was the king dog.

What a time they had getting the eager dogs harnessed! Even with the back of the long, slim komatik (kô măt'ik) sled tied to a post, it took Father to hold

Venture, Prue to untangle Queen from the twenty-foot trace in which she was determined to wind herself up like a top, and Danny to straighten out Bruce's straps and try to hold Huskie at the end of his long trace, until Mother could button all their traces to the bow line of the sled.

Finally, just as the gray top of the cliff gleamed pink, Danny jumped on the sled, holding tightly to the slats with his mittened hands. Father called, "Cut the rope, Prue," cracked his long whip, and they were off.

Father had to run alongside as fast as his snowshoes would carry him. The trail up the cliff was steep, but Foxie knew her way. Behind her, Venture pushed his great chest against his harness, put his nose to the ground, and bent his short, stocky legs to the task. The others followed, glad to be out of the cup-shaped harbor, out in the open where everything was pink. The mighty Atlantic stretched to the sunrise. Even the snow-covered barrens and hills to the west were pink.

The wind from the sea still felt icy. Danny was glad Mother had tied the fur hood of his warm canvas parka close about his face, and the sleeves close about the tops of his three pairs of gloves. She had seen, too, that the legs of his oilskin pants were pulled well down over the three pairs of socks inside his skin boots. He'd bring her a present from his fox money, Danny thought, and get something pretty for Prue, so sorrowful at being left behind.

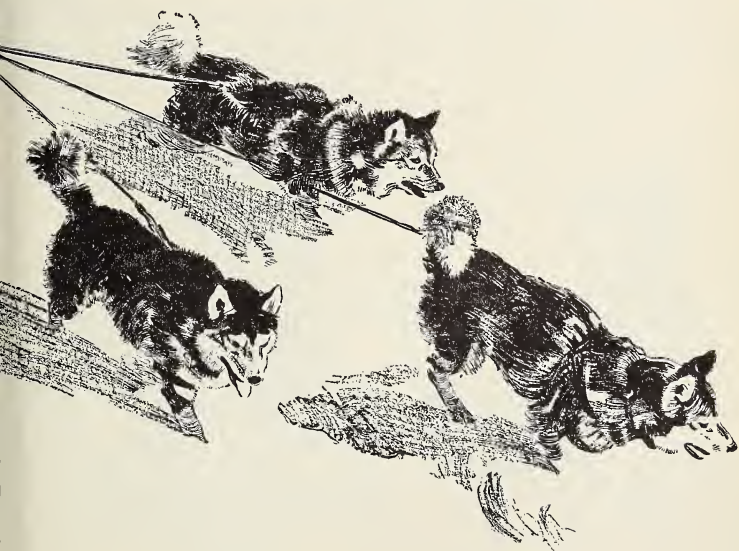
Father was warmer. He did not have to hold reins to guide the dogs. Shouts and the crack of his long



whip served instead. He ran on rackets, as he called his snowshoes, pulling, pushing, lifting the sled, to keep Danny and the pack of blankets, with the ax and the teakettle, from being whirled abroad. The gun was slung alongside where he could snatch it up if game should cross their trail.

Danny hoped they'd see a bear, a big white polar bear. A mountainous, snow-drifted boulder came in sight just ahead, more glittering in the early sunshine than the level whiteness. But it would be hard enough underneath when they whizzed down on it. Danny shut his eyes and hung on.

Danny was glad enough when the trail dipped to a flat lake. It was warmer in the hollow. Now Father could jump on the komatik sled and ride, too. They went like the wind over the ice. The dogs spread out, pulling for all they were worth. How they loved to run! The slick runners of the sled made no sound as they slid along.



"Whoop! Whoop!" Danny just had to break the white stillness. Even the little fir trees along the shores held their pointed tops so still in the snow.

"Whoop! Whoop!" Father's big voice echoed back from the white hills in the west. Venture thought they meant for him to go faster. His feet flew so fast that Danny couldn't tell which were his front and which his hind legs. To show Venture that everybody was happy, Father began to sing,

"Oh, O-h, a trapper's life would just suit me,
It is so happy and so free."

"Oh, O-h," echoed Danny, "—so happy and so free."

At noon they stopped among some snowy willows by the edge of a frozen brook to boil water in their kettle.

"Let me get the water, Father," Danny cried, and ran to fill the wide-bottomed tin kettle with snow. Where he stooped to scoop it out from beneath the crust, he noticed prints of wide little feet, and bits of willow bark where the partridges had been feeding.

"You'll need four times as much snow as you would water, Son," advised Father, busy stripping birch bark to start their fire. Danny hurried to bring more in his mittened hands.

Soon Father's fire of birchwood was blazing away in a hole in the snow, something yellow and red and black in the whiteness.

"When you sleep out, Son," he explained as he dropped a big pinch of tea leaves into the steaming pot, "you must dig a hole down to the ground. You

must make it big enough for yourself and the fire too, or the snow will melt and roll you into the blaze."

A gray jay flew scolding from branch to branch over Danny's head, where he squatted on the low komatik before the fire. Danny tossed him a bit of his precious smoked salmon. "Yaw, yaw!" shrieked the jay. He grabbed the salmon and dodged away so close over the dogs' heads that Venture, resting in the snow, snapped at him. Venture wouldn't get his fish until night, because dogs can't pull on full stomachs.

While Father smoked his pipe, Danny stared as far as he could between the white trunks of birches to the



low, snow-covered spruces deeper in the silent forest. "Father, do you feel that lots of wild creatures are watching us?" he whispered.

Already Father was putting the teapot back in the grub box and tying it fast to the komatik. "Look there." He pointed to an icy slide down the left bank near them. "That's where the otters play. If we had time to wait we might see the little fellows slide down, black and fat with fish, as full of fun as you and Prue when you coast down the hill behind the house."

He was testing the caribou-hide thongs now which bound the sled's flat slats close together on the solid juniper runners. "She'll bend on the edge of a rock. She'll wriggle over ice pans like a live creature," he told Danny proudly. "The best komatik I ever made. Eleven feet long, a bit over two feet wide; she'll give to the ground as a good canoe gives to the rocks."

"Which is a trapper's best friend, Father, his canoe or his sled?" Danny was peeling a layer of brown bark off his birch plate so that it would be clean for supper.

"Canoe for summer. Komatik for winter. And his gun and his ax and—" (Father's teeth showed white in his tanned face. His gray eyes were warm, although his breath froze on his mustache now that the fire was out) "—and his son Daniel, who'd better do something about getting these dogs started."

Again they were all set on the komatik, Danny behind the blanket roll, Father on one side where he could jump off if the dogs needed him. Foxie led her team single file between the trunks of trees. Once Huskie, her youngest son, shot off to the right by

himself and tangled his trace around the wrong side of a fir.

"Caribou!" Father pointed to oval holes crossing and recrossing each other in the snow. "But they're old tracks. Huskie could never catch up with them now."

Three times during the afternoon Father had Danny strap on his little round rackets and run beside him to get warm. Danny was too proud to cry with cold, but he was glad when Foxie led over the last hill. He looked down on a red flag waving above a scarlet roof,—more roofs, then a log dock, and the sea again, blue in the sunshine beyond its white ice.

A howl from the Hudson's Bay Post dogs said, "Welcome to our harbor, our teeth, and our stomachs."

Father left his team in a friendly trapper's pen, from which Venture could only howl back, "Thanks, we'd rather have your throats."

Danny kept quietly close to Father as he talked with the tall, light-haired young man behind the counter in the log store. He felt shy before so many strangers sitting about the stove in the long, low room.

Someone tugged at his parka sleeve. A boy about his height, but twice as wide, with straight black hair and twinkling, narrow eyes in a jolly round face, stood close to stare at him. Danny poked Father's arm.

"Eskimo," said Father, glancing down.

The boy pointed to a pile of sealskin moccasins on the counter and some baskets made of dried grass.

"Innuits (in' ŭ its) mother made 'em." The Hudson's Bay Company clerk looked up good-naturedly

as he finished writing things on Father's page in his big book. "All kinds of lads are in today. Their people are coming out from the barrens to camp for the summer."

Father turned to Danny. "Your skin's worth fourteen dollars, Son. I've traded my furs for flour, molasses, tea, tobacco, some twine, cartridges, and some cloth for Mother. What do you want for yourself?"

Slowly Danny selected a tiny basket of birch bark, with a red berry done in porcupine quills, for Mother's precious thimble. For Prue he chose a gay woven scarf, six feet long with a wide fringe of every color. The rest of the money he planned to save.

"Make haste, Son. We must reach the tilt before dark," urged Father.

Danny hurried to help Father strap the three barrels of flour, the keg of sweetening, the heavy box of cartridges, the light box of tea, and all the other things beneath the oilskin cover on the komatik, not forgetting the sack of frozen fish for the dogs. Then he piled himself on top and hung on for dear life.

Heavy as the load was, the dogs knew they were pulling toward supper. They dug their stout feet into the snow and, where the ice was clear, whizzed along, scattering clouds of flakes over Danny.

The red sunset was gone from the sky. Moonlight slanted down through the black firs. Danny was stiff with cold, when at last Father stopped before a mound of snow. It looked like any great drifted boulder except that a black stovepipe stuck out from the white top. It was a tilt, or camp built of logs.

In a twinkling Father had cleared the tilt's low door, led Danny inside, lighted a candle, poked the dried sticks outside the tin stove into it, and had a fire roaring.

"Pull off your parka and boots, Son. Get thawed out."

Danny's eyelashes, which had felt frozen shut, opened wide as he stared around the tilt in the candlelight. About eight by ten feet, of log walls with one tiny pane of glass for a window—how Prue would love it for a playhouse!

The bunks were of fir boughs, the doorway was just high enough for a man to stoop through, and the stout door had hinges and latchstring made of sealskin. The hinges were not so stout, though, as those at home that Father had bent from the steel hoop off a molasses barrel.

Soon the tilt was hot. Danny soaked the warmth into his bones. He thought maybe, when he got thawed all through, he'd fall apart. Then, ashamed, he thought of Father out there, feeding the dogs, chopping wood, doing all the work. He grabbed up the kettle and stooped through the doorway to get snow.

In the moonlight a curious rabbit sat up, stared a second, then with long hops moved down the trail, ears flapping and white cotton tail bobbing. Father was just coming in. He left his snowshoes on a peg outside so that they would hang flat against the wall. His sharp ax he drove into a tree near the doorway.

"Why don't you burn that old tree?" asked Danny, pointing to the one nearest the tilt.

"You must always leave a dead tree in reach of some hunter who might get sick or hurt," explained Father when they were sitting all cozy on the brush floor inside, their backs against the low bunk. "And don't forget to leave enough flour for a baking of flat cakes like these. Have another?" He handed Danny his fourth round river cake. In such a few moments Father's quick hands had mixed flour, salt, water, and a bit of baking powder to make the best bread Danny had ever tasted. The strong black tea was the best tea he had ever drunk.

The bunk with its sweet-smelling fir boughs was the best bed he had ever slept in—only he was too happy to sleep. He lay wide-eyed, staring at the fire-light flickering on the beams overhead.

"What's the roof made of?" he asked Father, who lay like a gray blanket roll beside him.

"Birch mostly. Birch is the trapper's friend; over his head, in his stove, frame for his rackets, his canoe, and"—Father chuckled—"rod to beat bad boys in school."

Danny was having too good a time to worry about school. What fun to lie like two partners on the fur path, snowy miles away from everybody! Miles of lonely trail over icebound rivers, white ponds, and still forests. "What animal is his friend, Father?"

"Venture answers that," laughed Father. "'Oo-ho-ooo, the dog,' says he." Foxie's family were raising their first howl to the moon. Danny knew how they looked, sitting on their haunches, noses in the air, the moon casting their shadows black on the snow.

"What wild animals, Father?"

"Caribou, I'd say. They're good from their hide to their bones to make soup of. Their meat—their milk—they can haul a sled, too, and eat the moss where nothing else grows."

"What fish, Father?"

"Cod, Son. We use all o' him. The insides we can't eat; so we feed them to the dogs or put them on the potato patch."

Danny felt solemn. "God is good to us, isn't He, Father? He gives us the forest and the wild things in it. The sea and the fish—just to come and get."

"Yes, Son, and He gives a Labrador lad a quick hand and a strong heart, or he couldn't catch 'em. See how you trapped that fox. You have ten dollars already." Father rolled out of the bunk to put another slab of birch into the tin stove.

"What does God send mice for?" Danny whispered.

"The more mice, the more foxes," explained Father drowsily. "About every seven years the mice are all gone, and the foxes too. The more foxes, the more flour—and presents—and—"

Danny was asleep. Suddenly he heard a shot. He jerked upright in the bunk. Where was he? All the dogs were howling. Where was Father? His blankets were empty.

Icy air swept into the tilt. Father came stooping through the open door, snowshoes in one hand, gun in the other. "Wolf," he explained as he barred the door, "eating the deerskin thongs off my rackets. Weather's changed. Snowin' hard outside."

It was Foxie who was to guide them safely home through the storm the following day, but she could never have done it without Venture's strength helping her. At Father's whistle in the whirling gray dawn, she uncurled herself from the hole where she had slept in the snow, snapped out an order to her family, and led off shoulder-high through the drifts.

For hours Father struggled on ahead, breaking the trail, forcing his rackets through the dry, hard-driven snow. At last he knew he had lost his way in the white smother. Then he let Foxie lead while he followed behind the komatik with its white bundle on top, which was Danny, half-frozen.

Foxie turned sharply to the left, and in half an hour Father recognized Fox Head looming through the thinning flakes toward the sea. The snowstorm swept inland. "The Merry Dancers," or northern lights, flickered on and off in great crimson-and-yellow curves across the sky. But Foxie saw only one little light in the cabin below the hill. Supper!

The smell of smoke from the home chimney put new life in the dragging dogs. Father had just time to fling himself on behind Danny, using his feet for brakes. Foxie, Bruce, and Queen jumped to the left, Venture and Huskie to the right of the rushing sled. The runners grated on the top of a big rock. Down! Down! Father was barely able to swing the heavy komatik aside at the lean-to door. It flew open. Mother and Prue rushed out. Danny awoke to the fact that he was home, safe from the wild and all the wild creatures.

Edith Tallant

Using Details to Broaden Understanding

The story of the trip to the Hudson's Bay Company Post has many interesting details that give a clear picture of the Labrador country in which Danny lives. The exercises that follow show three ways in which these details may be used to make your understanding of Labrador more complete and accurate.

A. SELECTING DETAILS THAT BUILD UP AN IDEA

The author makes very skillful use of details in order to make the deep snow, the severe cold, and the stillness seem real to you. She does this by means of such phrases and sentences as "two cold sunrises after," "white stillness," "the wind from the sea still felt icy," "his breath froze on his mustache now that the fire was out." Choose from the story and copy on your paper five other interesting phrases or sentences that build up the ideas of *deep snow*, *severe cold*, and *stillness*.

B. DRAWING CONCLUSIONS

From the details in the story we are able to learn much that the author does not tell us directly. For example, no direct statement in the story answers the question *Was the Labrador country where Danny lived level or hilly, barren or wooded?* However, such statements as "a mountainous, snow-drifted boulder came in sight," "the trail dipped to a flat lake," "Foxie led over the last hill," and "Foxie led her team single file between the trunks of trees," would lead us to decide

that the trail to the Hudson's Bay Company Post wound through hilly, wooded country. When we get an idea by thinking in this way, we are said to "draw a conclusion."

Can you draw conclusions about the questions given below? Be able to tell the reasons that led you to draw each conclusion.

1. Did the dogs like to fight?
2. Is the Labrador country thickly settled?
3. Was Danny's home on a hill or in a hollow?
4. Are certain rules for the use of a camp, or tilt, followed by good trappers in Labrador?
5. Does Labrador have much wild game?
6. Was Danny a generous boy?
7. Can dogs sometimes find their way when men are lost?
8. Who depend more upon stores to supply their food and other needs—the people of Labrador or the people of your community?

C. ASKING QUESTIONS ABOUT INTERESTING DETAILS

1. How did Danny clean his plate after the noon lunch on the trail?
2. How did Danny get water for the tea for the noon lunch?

Find the answers to the two questions given above. Then write two other questions that can be answered by interesting details from the story. You will have an opportunity to ask your classmates to answer these questions.

A Great Frenchman — Pasteur

If you should be asked to vote for the American who had done the most good for his country, for whom would you vote? What service to his country would you point out as a reason for your choice?

Read this lesson to find out what Frenchman was chosen by the people of France as having done the greatest good for his country. In what ways did this Frenchman serve his country? Why did all the civilized countries of the world do honor to this scientist?

1. A few years ago a French newspaper asked the people of France to vote for the Frenchman who they thought had done the most good for his country. Some people said that a famous general, Napoleon, would be chosen, but the person who received the greatest number of votes was a scientist, Louis Pasteur (päs'tûr'). It has been said that Pasteur saved more lives than Napoleon destroyed.

2. On the evening of December 27, 1922, the bells in the little village in France where Louis Pasteur was born rang to celebrate the one-hundredth anniversary of his birth. At the same time bells throughout all France rang to do honor to the memory of this great man. All the civilized nations of the world, also, joined France in celebrating the anniversary of Louis Pasteur's birth.

3. The boy who was later to be honored by kings and emperors was born in a humble home. His father was a tanner of leather. Louis and his father had a

great love for each other, and the father, as long as he lived, understood and appreciated his son's work. The two often studied together in the evenings, for it was the father's desire that his only son should become a scholar.

4. Sometimes he read to the boy stories of battles from the history of France, for this tanner had been a soldier in the armies of Napoleon and had been given the cross of the Legion of Honor for his bravery. Many years afterward, when Louis had become a man, he said to his father, "In teaching me to read, your care was to teach me the greatness of France."

5. When Louis was fifteen years old, he was sent to a boarding school in Paris. Here he was so homesick that he could neither sleep nor eat. At last the head of the school, fearing for the boy's health, sent for Louis' father to take the boy home. Five years later, Louis Pasteur went back to the same school in Paris. In order to pay a part of the expense of going to school, he taught younger pupils from six to seven o'clock in the morning.

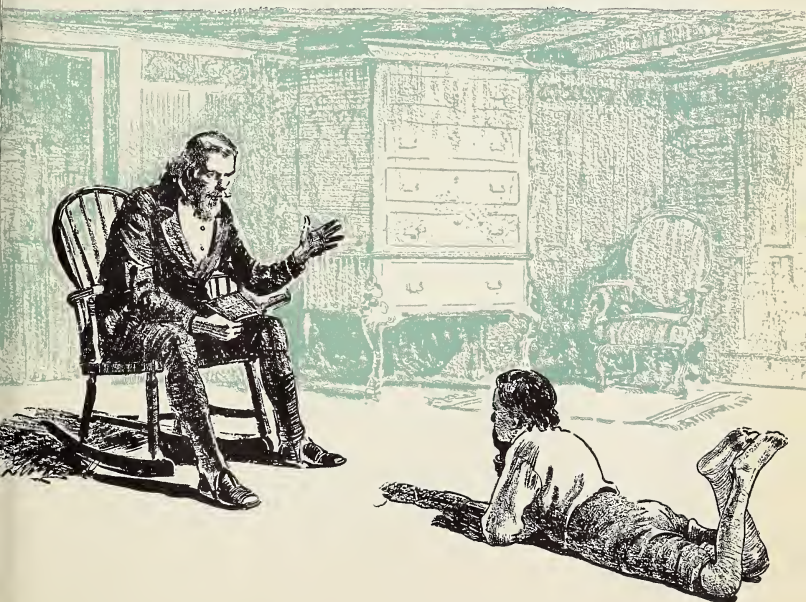
6. Louis spent a year at the boarding school and then entered a famous college in Paris. How proud his father was when Louis, after several years of struggle and hard work, earned a doctor's degree from this college!

7. The rest of Louis Pasteur's life was devoted to scientific work. His discoveries put an end to much ignorance and superstition.

8. At the time when Pasteur lived, many people believed that if a horsehair were put into water it

would turn into a snake. They believed also that caterpillars grew from leaves, and that bees came from the body of a dead bull. They even believed that life could come from dead things—that frogs and fishes grew from mud, and that mice could be produced by putting some dirty linen into a can along with a few grains of wheat. Of course the scientists of the day did not believe these silly ideas, but they did think that small things like germs could come from nothing. "Germs do not come from any living matter, but from air alone," said some scientists.

9. Pasteur proved that these beliefs were not true—that all living things, no matter how small, come from some form of life. He showed that many plants and



animals develop from eggs, or from other forms that are too small for our eyes to see without the aid of a microscope. He showed that germs do not develop from air alone, but grow from other living germs held in dust in the air.

10. Pasteur's discoveries saved the industries of France millions of dollars and were later of great benefit to the whole world.

11. The first important industry that Pasteur helped was the wine industry. The makers of wine had begun to lose much money because diseases were attacking the wines, causing them to spoil. Even the best of wines sometimes went bad, and the wine makers could not discover the cause of the trouble. The emperor of France asked Pasteur to try to find a way to keep the wines from spoiling.

12. Pasteur found that the diseases that were attacking the wines were caused by living organisms called bacteria. After much study, he discovered that heating the wines kept them from spoiling. This was because the heat destroyed the bacteria. But the makers of wine were at first unwilling to heat their wines, because they thought that this would spoil the flavor. In order to find out whether or not heating did spoil the flavor of wine, the following experiment was tried.

13. Some wine was placed on a ship. Half of it had been heated and half had not been heated. The vessel went on a voyage that lasted ten months, and at the end of that time the wine was examined. The wine that had been heated had a fine flavor, but that which had not been heated was spoiled.

14. While Pasteur was still working on the diseases of wine, he was asked to go to southern France to study a disease that was destroying the silkworms there. The worms were dying in such numbers that the silk industry of the country was in danger of being wiped out. Pasteur worked for six years before he found a way to protect the silkworms from the diseases that were attacking them.

15. A third industry to benefit from Pasteur's work was agriculture. He discovered how to vaccinate animals to protect them from certain diseases. Many people laughed at him when he said that by vaccinating cattle and sheep he could save them from a very deadly disease called anthrax. Then Pasteur offered to prove the worth of his discovery by a public experiment.

16. Fifty healthy sheep were given to him for the experiment. A crowd of doctors, farmers, scientists, and newspaper men came to see the test. Many of these people expected the experiment to be a complete failure.

17. Twenty-five of the sheep were vaccinated. The other twenty-five were not vaccinated. Some days afterward the fifty sheep were given the germs that cause anthrax. A month later the crowd again gathered to learn the results of the experiment. When Pasteur arrived, the people broke into a wild cheer. Twenty-two of the unvaccinated sheep were dead; the other three were dying. But all the vaccinated sheep were alive.

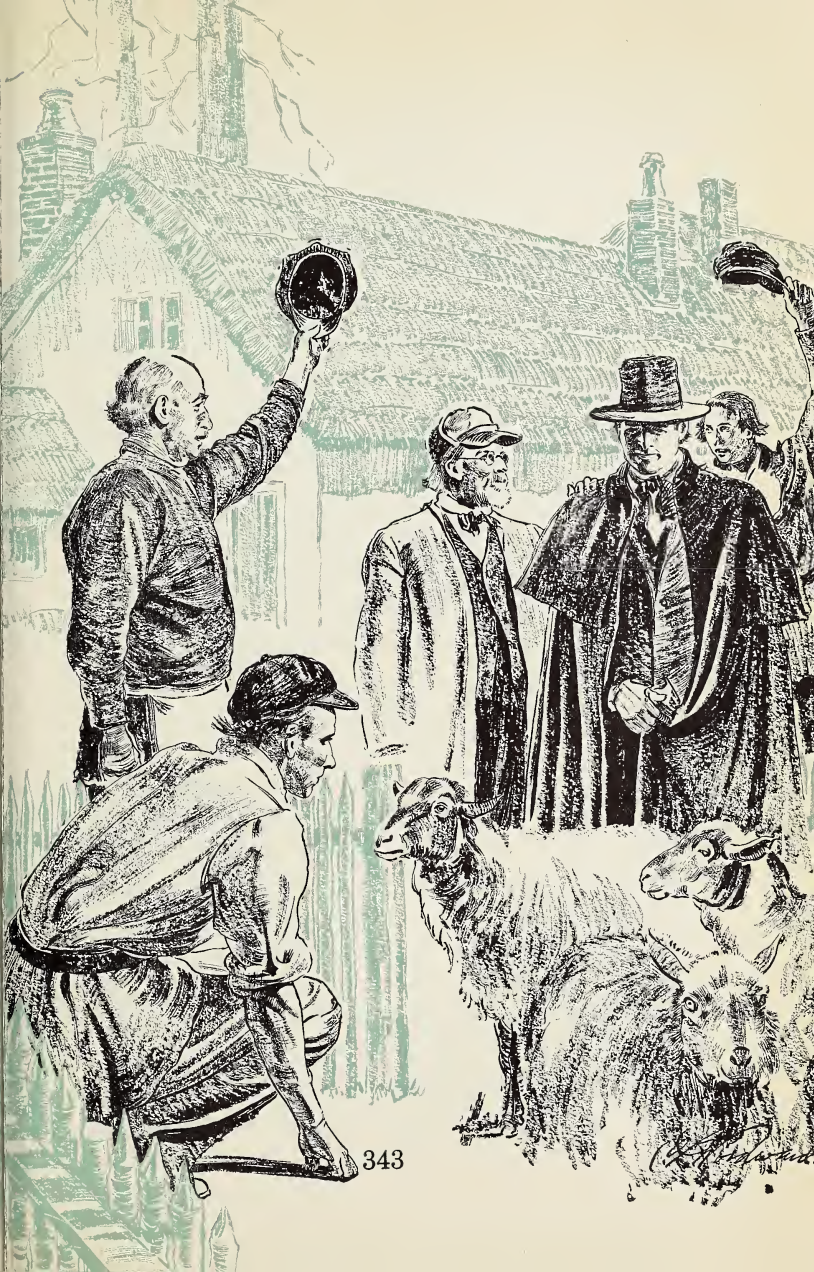
18. Pasteur's services to the industries of his country were important, but far more important was the work

that he did to relieve the suffering and to improve the health of human beings.

19. You may owe your life, as do countless thousands of people, to Pasteur's discovery that the diseases of wine were caused by living germs, for this discovery suggested to his eager mind that the diseases of men and of animals might be caused in the same way. He spent long years in hard, painstaking study that gave the world not only a better understanding of the causes of disease but also new means of protection against certain diseases.

20. Pasteur proved that disease and infection are caused by living germs. People had believed that the causes were evil spirits, spots on the sun, or vapors that rose from the earth. Doctors had not boiled the instruments used for operations nor had they tried in any other way to prevent germs from entering wounds. So many people in hospitals died from infection in wounds that one surgeon said, "A pinprick is an open door to death."

21. At first many doctors and scientists did not believe that germs in the dust of the air could spread infection and disease. They laughed at Pasteur and called him a useless dreamer. Pasteur had worked hard for years, patiently making thousands of experiments in order to prove his ideas about germs. Now many doctors refused to make use of his discoveries. But Pasteur was determined that the lives of his fellow men who were dying needlessly in hospitals should be saved. He carried on a bitter fight against ignorance, taking time from his work to make fiery speeches in



which he explained the facts about germs. He was not well, and his friends begged him to rest, but he would not spare himself. Little by little doctors came to believe in Pasteur's ideas and to put them to use. Much of the great work of saving lives that has been done in the last fifty years was made possible by Pasteur's discoveries.

22. One of the discoveries made by Pasteur while studying the diseases of wine has helped to save the lives of many people. You will remember that the wines were heated to a temperature that would keep them from spoiling and yet would not hurt the flavor of the wine. This method of heating a liquid in order to kill any dangerous germs that may be in it is called pasteurization. Today most milk is treated in this way. Pasteurized milk helps to save the lives of children and adults because dangerous germs in the milk have been killed.

23. Another of the important discoveries made by Pasteur was a method of saving the lives of people who had been bitten by mad dogs and by other mad animals. A "mad," or rabid, animal is one that has a disease called rabies. The disease in human beings that results from the bite of such an animal is also called rabies, or sometimes hydrophobia.

24. Before Pasteur discovered a way to check rabies, many people had been so afraid of this terrible disease that they ran away from those who were ill with it, leaving them to die without care. All sorts of ridiculous cures, such as crawfishes' eyes, were suggested. Another of these cures was a stone, called a madstone.

This stone was supposed to cling to the wound to which it was applied until it drew off the poison from the body, dropping off after it had done its work.

25. One method used by doctors in treating those who had been bitten by a mad animal was to cleanse the wound by burning it with a red-hot iron or with an acid. If this was done immediately after the person had been bitten, hydrophobia sometimes did not develop. When Pasteur was a boy, he once saw the terrible suffering of a farmer who was being held down by six or seven neighbors while a blacksmith pressed a red-hot iron into the wounds given him by a mad wolf. Years later, when a man of sixty-two, Pasteur was able to begin experiments that made such painful treatment unnecessary.

26. Pasteur discovered that the germs of rabies are found in the saliva of the infected animal. He found a way to vaccinate people who have been bitten by a mad, or rabid, animal so that rabies does not develop. The treatment was first used on animals and was successful, but Pasteur hesitated to use it on people.

27. While he was making more sure of his methods, a chance came to test the value of the cure. A nine-year-old boy was brought by his mother to Pasteur's laboratory. Two days before, the boy, while on his way to school, had been attacked by a mad dog, thrown to the ground, and severely bitten about the hands and face. The case was an especially serious one because it was so long since the boy had been bitten.

28. The treatment that Pasteur gave the boy extended over a number of days. Everyone waited

anxiously for the result. There was great rejoicing when the boy did not develop rabies. The treatment had been successful.

29. A short time afterward another boy was brought to Pasteur for treatment. This boy was a shepherd who had been bitten while trying to protect some younger children from a mad dog. Although the boy had been bitten six days before the treatment was begun, he was successfully treated.

30. Across the sea in America, a group of people raised money enough to send four poor children who had been bitten by so-called mad dogs to France for treatment at Pasteur's laboratory. The children arrived in Paris many days after they had been bitten, but the treatment was successful.

31. Pasteur was particularly interested in the children who came to him for treatment, and they grew to love him. He kept new copper coins and sweets for them in his desk drawer, and comforted them when they suffered from the pain of bites. One little girl had holes bored in these coins and made a necklace of them. On the day she went home, she threw her arms about Pasteur's neck and kissed him good-by, as she would have kissed her grandfather.

32. At one time nineteen Russians who had been bitten by mad, or rabid, wolves came to Pasteur's laboratory for treatment. It was very doubtful whether these men could be saved because two weeks had gone by since they were bitten. They were given the treatment twice a day. Only three of the men died. In appreciation of what Pasteur had done for these



Russians, the Czar, then the ruler of Russia, presented Pasteur with a diamond cross and a large sum of money to be used in his work.

33. Today it is no longer necessary to go to Paris to obtain treatment for rabies. This treatment is given by doctors in all parts of the civilized world.

34. Although Pasteur struggled for many years against disbelief, he was greatly honored when he was older. A fine laboratory was built for him in Paris. The money for this beautiful building was given by people from all over the world. Both rich and poor contributed to it. This was the first good laboratory that Pasteur had ever had. Most of his greatest discoveries had been made in a crowded attic workshop. He had never had enough money to pay for the help that he needed. Often he had worked far into the night

putting his workshop in order so that he could go on with his experiments the next morning. Now an old man, he proudly watched the many young scientists employed in the laboratory and knew that his work would live on.

35. This famous laboratory was named the Pasteur Institute. Here experiments are carried on to help in discovering ways of making the world a more healthful place in which to live. It has been called "the world's



greatest life-saving institution." In front of the building is a statue showing a shepherd boy wrestling with a mad dog. The man who is standing beside the statue in the picture was one of the first boys whose life Pasteur saved. This man is now a janitor at the Pasteur Institute.

36. On Pasteur's seventieth birthday a great celebration was held in Paris. Doctors, scientists, and statesmen from England, Russia, Germany, Italy, the United States, and many other countries of the world came to honor him. Pasteur came into the great hall where the celebration was held leaning on the arm of the President of France.

37. Three years later Pasteur died. He was buried in a beautiful chapel at the Pasteur Institute.

How Well Do You Remember What You Read?

On a sheet of paper write from memory a list of Pasteur's services to his country. In order to keep your answers as brief as possible, you may set them down like this:

<i>Pasteur's Discoveries</i>	<i>Results</i>
1. How to pasteurize liquids	Saved the lives of thousands of people

When you have listed all the services you can, draw a line under what you have written and go back through the lesson to see if you can find additional facts to include in the list.

Learning to Divide Material by Means of Sectional Headings

Many of the books that you use contain sectional headings that help you to locate material rapidly. The sectional headings that follow were copied from a geography. They divided into sections a part of the material given about Canada.

The Interior Plains
The Canadian Far West
Northern Canada

The story "A Great Frenchman—Pasteur" might be divided by the following sectional headings:

Honoring the man who best served France
Pasteur's boyhood and education
Discoveries that lessened ignorance and superstition
Pasteur's services to industries
Pasteur's services to the human race
The Pasteur Institute
Celebration of Pasteur's seventieth birthday
Pasteur's death

See how well you can select the paragraphs that belong under each heading. First copy these headings on a sheet of paper, leaving a blank line below each one. Then on the blank line under each heading write the numbers of the paragraphs which belong under it. For the first heading you would write

Honoring the man who best served France

1, 2

First Aid for a Cut

Did any of these accidents ever happen to you?

Stepping on a piece of broken glass and cutting your foot

Cutting your hand with a knife while you were whittling

Falling on a sharp stick and cutting your knee

Cutting your hand on the ragged edge of a tin can

If such an accident should happen to you or to one of your friends, it is important to know how to care for the cut.

A serious cut or one that is infected should be cared for by your doctor, but if the cut is small, you can care for it yourself.

You should take care of the cut immediately. Even slight cuts, if neglected, may allow dangerous germs to enter the body. Such germs may cause serious infection and much pain.

Allow the cut to bleed freely. The blood helps to wash out any germs that may be in the wound.

Use a pad of clean gauze or other cloth to wash the skin around the cut with soap and water. Tincture of green soap, which is a kind of soap in liquid form, is best, but ordinary toilet soap may be used. Be very careful that this soapy water does not enter the cut, since it may carry dirt and germs from the skin into the wound.

Now with a fresh pad, clean water, and more soap, wash out the cut itself. Make certain that you remove

any small bits of dirt that may have lodged in the cut. This careful washing is probably the best thing you can do for a cut; in fact, one doctor writes that the thorough cleansing of a wound with soap and water is of much greater importance than the use of any antiseptic.

After the cut is washed as clean as you can make it, an antiseptic solution may be put on the wound and the surrounding skin. The purpose of this is to kill germs. There are many standard antiseptics that are safe to use. Among these is tincture of iodine. If you use tincture of iodine, make sure that it is fresh; iodine that has been kept for some time may burn the wound.

Most doctors say that it is better not to put salve or ointment on a fresh cut. They say that the salve may hold the edges of the cut apart and cause it to heal slowly.

After you have washed the cut clean, and perhaps have put an antiseptic on it, you want to make sure that no more dirt and germs have a chance to get into it. A good plan is to cover it with a light dressing.

The best material for such a dressing is sterilized gauze, folded into a pad large enough to cover the cut and held in place with a bandage of gauze or with small strips of adhesive tape. Keep the dressing loose, for a tight one shuts out the air and slows the healing process.

Cotton should never be used directly on a wound, because the fibers will stick to the scab and cannot be removed. Court plaster is not satisfactory, because it

shuts out air and prevents rapid healing. Never place a tight, thick bandage over iodine, or a burn may result.

It is possible now to buy ready-made bandages of adhesive tape to which pads of sterilized gauze are already attached.

Sometimes the healed part of a wound is torn open when the dressing is removed. Usually this happens when the bandage is pulled in the opposite direction from the cut. Always remember to remove a bandage by loosening it in the same direction as the cut, and there will be less danger of opening the wound.

Practice in Memorizing

Choosing the important rules to be remembered.
It is important that you should remember what this lesson tells. You have learned that a doctor should care for a serious cut. If you know how to care for a small cut, you may save yourself a great deal of pain sometime.

Think over what you have read, and choose the important things to remember when you care for a cut. Make them into rules. You may need to use more than one sentence in stating some of the rules, but you should keep them as brief and clear as you can.

There are seven rules for caring for a small cut. The first two are stated for you.

1. Care for a cut promptly.
2. Allow the cut to bleed freely.

How to be sure you have all the rules. Usually we do not remember all the important things in a lesson from reading it once. Turn back to the lesson and read it again to see whether you have left out any rules and whether you can make any of yours better.

How to remember the rules. Write the rules that you have made. Read your list of rules carefully. Now, without looking at the list, see how many you can say. Keep on doing this until you can say all the rules.

Giving Reasons to Show the Importance of Following the Rules

Suppose someone should ask you why it is important to follow these rules in caring for a cut. Could you answer him? Imagine that the word *why* is written after each of the seven rules. Be able to give a reason to show that each rule is a good one. You may refer to the lesson as you work. There will be an opportunity to compare your reasons with those chosen by your classmates.

Listing Articles for a First-Aid Kit

After reading this lesson you can see that a first-aid kit for treating cuts need not include many articles. Make a list of the ones that you consider most important to have in your kit.

Learning to Make Graphs

Graphs are used so often today that everyone should know how to read them. Knowing how to make graphs is important, too. Often a class discussion or a talk in assembly can be made more interesting by showing a graph. Sometimes a graph helps to explain a talk or to make it more clear. Frequently the questions you must answer for yourself when you make a graph help you to get a better understanding of the numbers which you must use. This lesson will help you to understand more clearly how to make graphs.

In order to make a graph you must know what it means to draw to scale. You may have learned from your study of geography that the scale of miles on a map is the number of miles that are represented by an inch or by various fractions of an inch. In your arithmetic work you may have drawn to scale the plan of a house or of your playground. The scale of a line or bar graph is the part of the line or bar that stands for a definite number of units. The scale of a picture graph is the picture that stands for a certain number of units. For example, in a bar graph you may use a scale according to which one inch stands for 100 sheep; in a picture graph you may use a scale according to which a picture of one sheep stands for 100 sheep. Then on the bar graph two inches would stand for 200 sheep; on the picture graph two sheep would stand for 200 sheep. Turn to the graphs on pages 202 and 204 of this book and see whether or not you can tell the scale used in drawing each one.

Whenever you decide to make a graph, you should think about the following questions before you begin to work:

1. Just what is the question I wish to answer by means of a graph?
2. Exactly what facts shall I need to answer the question?
3. Will a bar graph, a line graph, or a picture graph answer the question most clearly and interestingly?
4. How shall I show the information on the graph?
5. What scale shall I use?

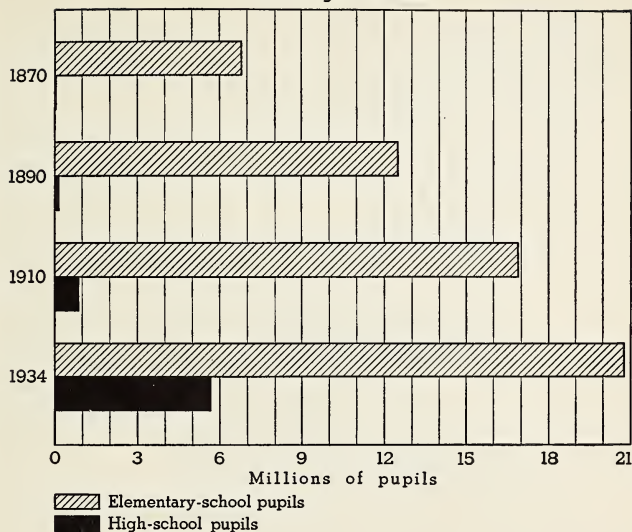
Suppose, for example, that you wish to show how the number of pupils enrolled in public schools has changed since 1870. The changes are shown in the following table:

PUBLIC-SCHOOL ENROLLMENT

<i>Year</i>	<i>Pupils in Elementary Schools</i>	<i>Pupils in High Schools</i>
1870	6,800,000	80,000
1890	12,500,000	200,000
1910	16,900,000	900,000
1934	20,800,000	5,700,000
1938	20,200,000	6,100,000

Now study the graph on page 357. It shows all the facts that are given in the table except the enrollment of pupils in the public schools in 1938. What questions does the graph answer? What kind of graph is it? What facts were needed in order to make it? Which

Millions of Pupils in Public Elementary
and High Schools



bars stand for elementary-school pupils? for high-school pupils? What scale was used? If you will measure with your ruler along the bottom line of the graph, you will see that one inch stands for 6,000,000 pupils.

What facts do you need to make the bars for 1938? Look for them in the table on page 356. How many pupils were enrolled in public elementary schools for that year? How many pupils were enrolled in public high schools?

In order to make the bars that show the number of pupils in public high schools and in public elementary schools in 1938, you must be able to answer the questions at the top of page 358.

1. What kind of bar shall I use for the elementary-school pupils?

2. What kind of bar shall I use for the high-school pupils?

3. Which bar shall I make first?

4. How long shall I make the bar that stands for the elementary-school pupils? ($20,200,000 \div 6,000,000 = ?$)

5. How long shall I make the bar that stands for the high-school pupils? ($6,100,000 \div 6,000,000 = ?$)

The facts about public-school enrollment are shown also on the picture graph on page 359. Notice its interesting title. Do you think you could make a graph like this one? Before you try, you must be able to answer these questions:

1. What is the symbol, or sign, that is used to represent pupils enrolled in the public schools?

2. How many million pupils does each symbol represent?

3. How many symbols stand for four million pupils?

4. How are fewer than 250,000 pupils represented?

5. How can you tell which are elementary-school and which are high-school pupils?

6. What should you do if a symbol must stand for fewer than two million pupils?

Now see whether you can finish either the bar graph or the picture graph. You may complete whichever one you prefer. First copy the part of the graph that is given in your book. Then show the facts for public-school enrollment in 1938.

They Went To School



Elementary
Schools



High
Schools

1870



•

1890



•

1910



1934



Each symbol represents 2 million Public School pupils enrolled

• Less than 250,000 pupils

When you have completed your graph, answer these questions about it:

1. Is the number of pupils in elementary schools increasing or decreasing?
2. Is the number of pupils in high schools increasing or decreasing?

3. About how many more pupils were there in elementary schools than in high schools in 1938?

4. Between which years was there the largest increase in the number of high-school pupils?

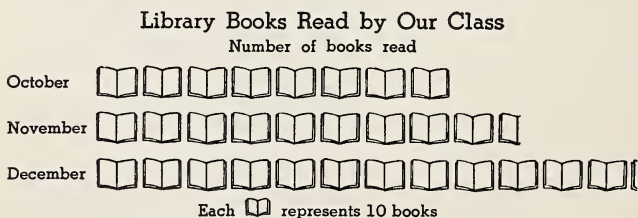
5. Between which years did the number of elementary-school pupils decrease?

6. How many more pupils were enrolled in public schools in 1938 than in 1870?

A person who understands a graph can tell in two or three sentences the main ideas that it gives. Write summary sentences that tell the most important facts about public-school enrollment since 1870.

Can You Finish This Graph?

A sixth-grade class kept a record of the number of library books read by all the pupils during eight months. Here is the total number of books for each month: October, 80; November, 96; December, 122; January, 125; February, 116; March, 118; April, 98; May, 86. A picture graph of the record for the first three months is shown below.



Can you make a picture graph of the record for the eight months?

The Story of Records

I. EARLY FORMS OF COMMUNICATION

We use books so commonly and can buy them so cheaply that it is hard to realize that it has taken thousands of years for them to be developed into their present form. Long ages ago, when men still hunted and fished for their food and made their clothing from the skins of wild animals, there were no books, no paper, and no alphabet with which to make words. Pictures scratched or carved on rocks, bones, or pieces of ivory from some animal's tusk told the story of important happenings; and notches cut along the edges of bones or sticks helped the people of those days to count.

When messages were sent to people who spoke other languages, the messengers carried not carefully written letters but objects which had special meanings. The Indians in this country were keeping their records and sending their messages in such ways as these when the first white men came. Many primitive tribes are doing so today.

Perhaps you already know the story of how an unfriendly tribe of Indians sent to Miles Standish, Captain of Plymouth, a bunch of arrows tied with a snakeskin. Miles Standish understood this to mean that the Indians were about to attack the colony. He therefore frightened them by sending back a snakeskin filled with powder and bullets, of which they were very much afraid.

Of course, a long message was sometimes hard to carry if many objects were necessary to tell it, and so



it is natural that pictures came to take the place of objects. A hunter could easily send home a message in pictures telling that he had traveled across a large lake in his canoe, through high mountains on foot, and had at last been successful in killing a number of deer.

The victory of Wingemund (wĩn'gě mōond), the chief of the Leni-Lenape (lěń'ĩ lěń'á pē) tribe who attacked the English settlements in the years 1762 and 1763, was described in the drawing on page 363. The lines at the bottom of the picture show twenty-three warriors, bending forward as they go on the warpath. The horizontal lines at the right show that the sun has

made ten pathways, four days of which made up one expedition and six days the other. In the center of the picture are the three English forts which were attacked: Fort Pitt at the joining of the Allegheny and Monongahela rivers, the square fort of the Detroit trading post, and the small fort on an island in Lake Erie. The ten conquered enemies are seen at the left. The four with heads are prisoners, the other six represent those who were killed. The tortoise in the corner is a symbol, or sign, which was commonly used by the Indians to represent safety.



The battle record of an Indian chief

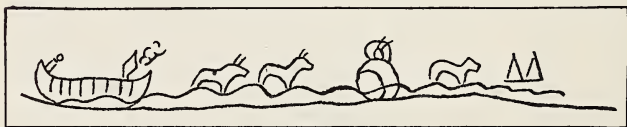
Many such pictures have been found, buried deep down in the ground, or hidden away on the walls of old caves. Some of them are only pictures of what the artists saw; some clearly mean to tell a story or to record an important event. These records are interesting to us, not only because they tell us much about the way people lived in those far-off days but because they show us the first steps in the art of writing.

Making Summary Sentences

Part I tells about early forms of communication. Each paragraph adds something to this story. Try to write a summary sentence for each paragraph, telling the important facts about these early methods of making records.

The Meaning of Picture Records

Each of the picture records below has a message. What do you think each one means?



Hunting record of an Ojibway Indian



Message left on a piece of wood by a starving hunter

Write some picture sentences of your own. See if the members of your class can read them.

II. HOW WE GOT OUR ALPHABET

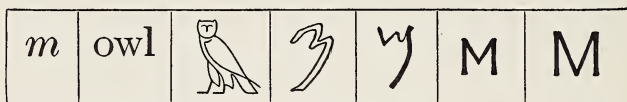
Nowadays when we are just beginning to learn to do something, we sometimes say that we haven't learned the *A B C*'s of it yet. This means that we do not yet know even the first things about it. Or if we want to say that something is easy to do or to learn, we say it is as easy as *A B C*. Really the *A B C*'s are not the beginning of writing, as we have just seen in the study of picture writing; and the alphabet was not easy to get, but has taken thousands of years and the work of many different groups of people in order to grow into its present form.

Our alphabet, as well as the alphabet of every other language, had its beginning in pictures of objects. These pictures, more or less changed, came to stand for words. We still use some of these old picture words. It is thought that Roman numerals, which stand for the words for numbers, came from pictures of the fingers and hand. The numerals I, II, III, were probably pictures of fingers; V was a picture of the fork of the hand with the fingers together and the thumb apart, meaning the whole hand, or five.

Sometimes one word had two or more different meanings. Then one picture stood for all the meanings. For example, in Egypt there was a little black beetle whose name was the same as the word for *to become*; so a picture of the beetle was used for *beetle* and for *to become*. It was as if in our language we made a picture of the sun to stand for both *sun* and *son*.

After a long time the picture came to stand not for

the whole word but for some sound in the word. To see how this worked, let us follow the history of our letter *m*. In the old Egyptian language the name of the owl was *mulak*. The picture of the owl stood for the word itself. Then the picture came to stand for only the sound *m*. But while this change was happening, the picture of the owl changed and was made more simple until we have our letter *M*, which really is only the two ears of the owl. Almost every letter can be traced back in the same way to the time when it was a whole picture standing for a word.



This shows the development of our letter "M" from the Egyptian picture-word for the owl

Answering Questions to Make a Summary

Write the answers to these questions in complete statements. You will then have a summary telling how we got our alphabet.

1. Did one group of people make our alphabet?
2. How long has it taken for it to be developed?
3. With what did our alphabet begin?
4. For what did these pictures stand?
5. For what did these pictures stand later on?
6. Were the pictures changed, too? Into what?
7. To what can these parts of pictures which stand for letters be traced?

III. FROM STONE TO PAPER

While all these changes in the kinds of writing were going on, there were many changes in the kinds of things people were writing on, too. We have seen that the earliest records were made on stone, wood, and ivory. Public records were often carved on sheets of bronze and lead. The laws were sometimes carved on metal or stone tablets.

In Babylonia soft clay tablets or bricks were written upon and then baked in the sun or in a fire. These lasted many years. In the ruins of one old city more than thirty-two thousand clay tablets were found. Some are military records; others are hymns to the gods, notes on geography, poems, fables, proverbs, letters, lists of stones, trees, birds and beasts, and many other things of interest.

The Romans used sheets of soft metal and small wax writing tablets. These tablets were of wood, one side being slightly hollowed out to hold the wax coating. Usually two of these were hinged together, but sometimes there were three or more fastened with rings or leather strings.

People wrote on these wax tablets with instruments called styles. The styles were pointed at one end for writing, and were flat at the other end for smoothing out the wax when a mistake was made. The styles were of iron, bronze, brass, wood, bone, ivory, or even gold and silver. Some of them were very beautifully carved and decorated.

All these things seem very different from the paper



on which we write today with pen and ink or pencil. But even at the time when some people were using the clay and metal and wax tablets, the Egyptians were making a kind of paper from the stem of a reed, called papyrus, which grew along the banks of the Nile. Strips of this stem were laid over one another cross-wise, wet with water from the Nile, dried, and polished. The Egyptians wrote on the papyrus with a small reed brush, using ink made of minerals, blood, the juice of berries, or charcoal. Later they used quill pens made by cutting and shaping and slitting goose quills. The long sheets of papyrus were wound around a short stick much as we wrap maps on a roller. It is from the word *papyrus* that we get our word *paper*.

Papyrus was sent from Egypt to Greece and Rome and was for many years the most commonly used writing material in Europe. Between the third and seventh centuries A.D., however, papyrus was used less and less. Instead, people wrote on the carefully prepared skins of sheep, goats, and calves. These were called parchment. One fine grade of parchment, made from calf-skin, was known as vellum. Parchment and vellum were smooth and tough. On them were written most of the beautiful manuscripts of the Middle Ages.

Paper was first made in China about one hundred years after Christ was born. In ancient times the Chinese wrote on the bark of bamboo or on pieces of silk. But bamboo was heavy and silk was expensive. Because a student, Ts'ai Lun (tsī lōn), was dissatisfied with these inconvenient materials, he set out to find better ones. He thought first of making paper

from the inner bark of the mulberry tree and later, from hemp, rags, and fish nets. In A.D. 105 he made a report to the emperor on the process of papermaking. The truth of this story about Ts'ai Lun is proved by a discovery which was made in 1907. In a watchtower of the Great Wall of China were found nine letters written on paper made within fifty years of Ts'ai Lun's report to the emperor. One of these letters, the oldest piece of paper in the world, is now in the British Museum.

Knowledge of how to make paper spread very slowly from China to the rest of the world. For some six hundred years, only the Chinese knew the secret of papermaking. Then in 751 several Chinese papermakers were captured in battle by Arabs and taken to Samarkand (săm'ěr kănd') in central Asia. Here the prisoners taught the art of papermaking to the Arabs, who carried the knowledge through western Asia.

In the year 900, or perhaps even earlier, paper was being made in Egypt. From Egypt papermaking moved slowly across northern Africa and finally reached Morocco by the beginning of the twelfth century.

When Moors from Morocco conquered territory in Spain, they carried the knowledge of papermaking to Europe. The first paper mill in Europe was built in Spain about 1150.

After it was introduced into Europe, paper did not come rapidly into general use. There were several reasons for this. In the first place, few people could read. In the second place, parchment and vellum were

still more satisfactory writing materials than the earliest European paper, which was poor in quality. Laws were passed in the thirteenth century forbidding the use of paper for public records and other important purposes.

Little by little, however, the European papermakers improved the quality of their product, and paper became more popular. A mill was built at Fabriano (fä'brè ä'nò), Italy, in 1270, and one at Nürnberg, Germany, in 1390, but no paper was made in England until 1494, two years after Columbus discovered America. Not until the fifteenth century, when printing with movable type began in Europe, was the usefulness of paper fully realized.

The methods used by the early European papermakers were much the same as those used in making handmade papers today. Indeed, the handmade paper found in our finest books is manufactured by a method that is only a little different from the method used in making the paper of the first books printed in Europe. The material also is the same—linen rags.

Only a small part of the great quantity of paper used in printing our books, magazines, and newspapers is made by hand from linen rags. Most of it is made by machinery from wood pulp. A great deal of this paper, especially that used in printing newspapers, does not last for long. However, linen rags are too expensive to use except for paper made in limited amounts. Many of the uses of paper with which we are familiar would be impossible without the large and cheap supply manufactured from wood pulp.

Selecting Important Information

Prepare to give a good explanation of the following topics by listing the most important points under each one:

1. *Earliest Writing Tools*
2. *Papyrus Records*
3. *Papermaking in China*
4. *Papermaking Today*

Reading Dates

"Knowledge of how to make paper spread very slowly from China to the rest of the world."

If you can read dates well, you are better able to understand this statement from the lesson you have just read. The first one hundred years after the birth of Christ are called the first century A.D. A.D. is an abbreviation for the Latin words *Anno Domini* meaning "in the year of Our Lord." All the years up through 100 were in the first century A.D.; all the years from 101 up through 200 were in the second century A.D.; and so on.

Test your ability to read dates by answering these questions:

1. Ts'ai Lun's report to the emperor showed that paper was made in China in A.D. 105, or near the beginning of what century?

2. Chinese papermakers taught the Arabs of Samarkand to make paper in 751, or about the middle of what century?

3. From the year 105 to the year 751, or a period of some six hundred years, only the Chinese knew how to make paper. For about how many centuries did the Chinese keep the knowledge of papermaking a secret?

4. Paper was made in Egypt in the year 900, or at the end of what century?

5. Knowledge of papermaking reached Morocco by the beginning of the twelfth century. In what year did the twelfth century begin?

6. The first paper mill was built in Europe in 1150. About how many centuries after the Chinese first made paper was the first paper made in Europe?

7. About how many centuries did it take for the knowledge of papermaking to travel from Samarkand in central Asia to Europe?

8. Paper was not made in England until 1494. This was near the end of what century?

9. The real usefulness of paper was not realized in Europe until printing with movable type was introduced in the fifteenth century. About how many hundred years after the Chinese first made paper was the real usefulness of paper realized?

IV. THE DEVELOPMENT OF PRINTING

Even with the great improvements in the materials on which the people of Europe could write, most of the books of the Middle Ages were written by hand. This was true whether the books were made of vellum, parchment, or the new kinds of paper. Many of the books of that time were church books; some were books of law; some were about the study of the stars,

in which people were very much interested. Because only a few people knew how to write in those days, books were something to be highly prized.

Since the monks were the best-educated people of the time, it is easy to see why most of the old books and manuscripts were made by them. Their books which have been kept until today are very beautiful, with great initial letters in lovely colors. Some are decorated with borders in the margins or with pictures painted in gold and bright colors. Often it took many months to finish just one book. On page 375 you can see a leaf from one of these old books.

Although most of the books were done by hand, there were some beginnings in using type. Sometimes the initial letters were printed with a wooden stamp on which a very beautiful capital letter had been carved. In some countries these letter or design stamps were made of baked clay. Such stamps could be used over and over, just as a rubber stamp can be inked and used many times.

A further development of a kind of type was the carving of solid blocks of wood with which to print whole pages. These blocks often had many pictures on them, and both pictures and letters were carved on the face of a solid wooden block. This block was then inked, and damp paper laid on it to take off the impression. This was called block printing, and the books printed in this way, block books. The first block books were printed in Europe in the fifteenth century, but the Chinese were making block books at least six hundred years earlier.

ne iesu accipe spi

ritu meuz. c. o. c.

Intedi
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Bilis est locus iste



Block printing was a very slow process. It took a long time to carve each print block, and when it was done it could never print anything but that one page. It was plain to be seen that printing could never be done very fast until a system was found by which the carved type could be used again and again in many different books. If each letter were a separate piece which could be put in or taken out as the printer pleased, the printing could be done very much faster. Movable type was needed in order to print books cheaply or in large numbers.

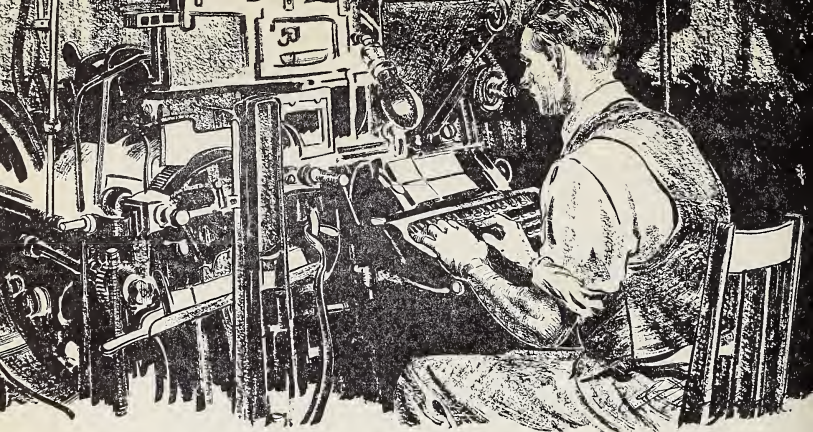
The Chinese, who invented paper and block printing, were also the first people to use movable type. They made the type of baked clay or of wood. Although invented in China, printing with movable type never became important there. The Chinese system

of writing had so many thousands of characters that it was easier to cut wooden blocks than to arrange type in order. It was in Europe, with its alphabetically written languages, that the invention of printing with movable type brought books within the reach of all.

There have been many arguments over who first printed with movable type in Europe, but most people now believe that the honor belongs to Johannes Gutenberg (yō hān'ēs gōō'těn bĕrk). He made type of uniform size so that it could be locked together for printing without being uneven or falling apart; the type was also of uniform height, so that all type letters would print; and the material of which it was made was so cheap and easy to work with that he could have enough types of each letter for printing his material. These three things really were the invention of printing.

With this movable type a page was set up; that is, the letters were placed in order in a frame, the face of the type up, like a rubber stamp. When the whole page was set up, it was "locked up" so that it would not fall apart. Then the type was inked, and the impression was taken off by placing the paper on the inked type and pressing it down firmly with a heavy hand press.

Later inventions in printing machinery have resulted in wonderful progress. When each separate letter had to be set in place by hand, it took a very long time to set up a whole book. But the invention of the linotype and the monotype made possible much more rapid work.



The operator of a linotype sits at a keyboard which is somewhat like a typewriter. By striking the keys of the keyboard, he sets up a line of the type ready to print. The machine is called a linotype because it makes a complete line of type at one operation.

The monotype is somewhat the same, but it makes each letter separately instead of the whole line at once. If a mistake is made in the line of monotype, it can be corrected by changing just the one or two wrong letters. This is easier than remaking the whole line, as must be done with the linotype corrections.

Improvements in presses, which are the means of taking off the impression of the type on paper, have been made, too. The old hand press, run by two men, could print in an hour one hundred sheets eighteen by thirty inches in size, on one side only. An average power press of today is able to print, fold, and paste 60,000 twenty-four-page newspapers in an hour. Most newspaper presses, however, are run at the rate of

40,000 to 45,000 papers per hour, but best printing results are obtained when the number is kept down to 40,000 per hour or under.

Can You Find the Main Points?

The section you have just read is called "The Development of Printing." It might also be named "From Handmade Books to Press-made Books." Keeping in mind this development, write a list of things to which you should refer in giving a summary discussion of this section. You will have about nine *main* points.

Planning a Program

"The Story of Records" is an interesting subject for a program to which you might invite your parents or another class. A list of nine topics about which talks might be made is given below. Choose one topic about which you would like to talk.

How primitive people sent messages

Indian picture writing

How our alphabet grew

Babylonian and Roman records

Papyrus records

The discovery of paper

Books of the Middle Ages

The invention of movable type

A modern printing press

Find and reread the part of the lesson that tells about the topic you chose. In preparing your talk you may wish to look for additional material in an encyclopedia or another reference book.

The Tallest Building in the World

✓ What is the tallest building you have ever seen? Have you ever watched the men at work on the construction of a skyscraper? This lesson tells about some of the things you would see if you should watch such a construction job.

Some of the words in the lesson may bother you if you have not read and talked much about skyscrapers or other big construction jobs. It will be a good idea to make sure that you understand the pronunciations and meanings of these words before you start to read. Look up each of the following words in your dictionary and discuss them with your classmates.

diameter	rivet	framework
barges	anchorage	derricks
architects	concrete cylinders	blueprints

It was October, 1929. A number of men in overalls had climbed out on the roof of the Waldorf-Astoria Hotel, which for thirty-five years had had no rival as the most fashionable hotel in America. The men were carrying crowbars, picks, and sledge hammers. Several of them started to cut a great hole in the roof. Others battered down the top part of a wall. A great motor truck had pushed its huge bulk through the front entrance downstairs. What was a motor truck doing in a hotel?

The Waldorf-Astoria was being torn down. It was to make way for a skyscraper, an impressive structure of commerce, a building higher than any that man had built before.

Five months after the first piece of wall was broken off, the flaming oxyacetylene torches and the sledges and other tools of the wreckers had changed what was once the most fashionable of hotels to 16,000 truck-loads of wreckage. This was carried to barges, and five miles beyond Sandy Hook the Waldorf-Astoria Hotel was dumped into the ocean. In many cities such waste material is used to fill in swampland, but New York is so large and crowded that it is cheaper to haul the stuff out to sea.

Before the building was completely torn down, men were burrowing into the earth beneath to prepare the foundations for the mightiest peak of New York's mighty skyline, the Empire State Building.

This tallest of all tall buildings was to bring together the experience gained by engineers, architects, and builders during nearly fifty years of skyscraper building. In its general plan the new building would not be any different from the other steel-frame buildings which had already been erected in New York and in other large cities. A framework of riveted steel would support a covering of stone and glass, but in this case it would lift its concrete floors up and up for 102 stories. It would be the highest one (1250 feet) of several high buildings, some of which are:

The Chrysler (krīs'lē'r) Building (1046 feet)

The Eiffel (ī'fē'l) Tower (984 feet)

Cities Service Building (950 feet)

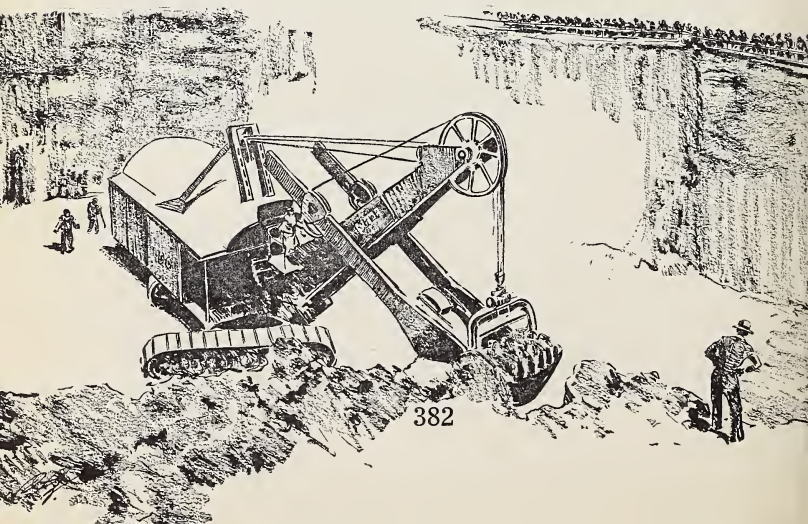
Manhattan Company Building (927 feet)

RCA Building in Radio City (850 feet)

The Woolworth Building (792 feet)

All tall buildings are set upon the firmest of foundations, when possible upon the bedrock which is the backbone of the earth itself. Only when a solid foundation can be reached, can skyscrapers rise. Otherwise the thousands of tons of steel, stone, and other materials would push down into sand, earth, or loose stone by their own weight, and a building started upon such an unsafe foundation would probably topple over even before it was completed. It is the layer of granite, a kind of very hard rock, lying not far under the surface of Manhattan Island, which makes possible the soaring towers of New York City.

The careful planning of the engineers and architects of the Empire State Building showed that the new building was to weigh the tremendous total of 303,000 tons. So earth and rock were blasted and removed to provide a firm anchorage for two hundred solid concrete cylinders, each ten feet in diameter. The steel



columns of the completed building rest on these concrete foundations so as to spread the weight evenly over a large area.

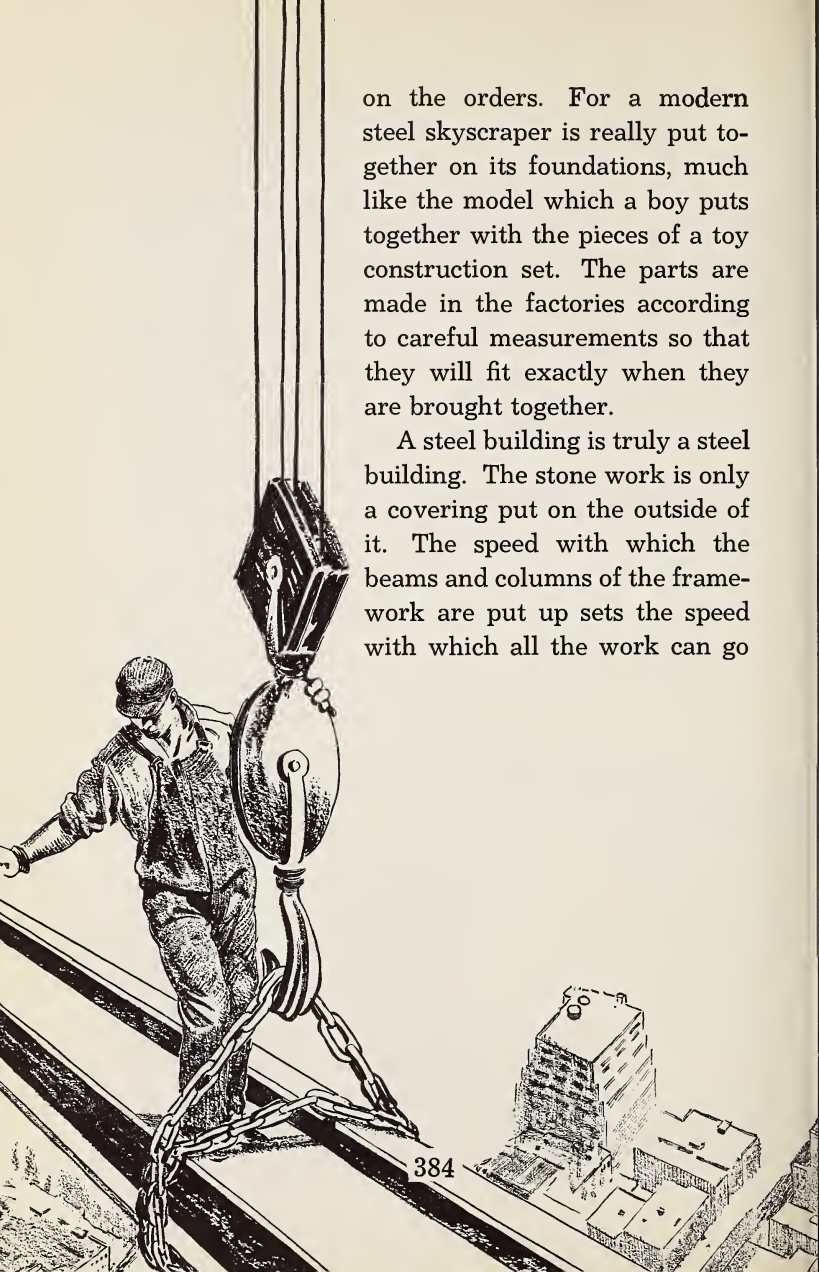
You may perhaps wonder how even the bedrock itself can always support such a tremendous load, and whether it may not some day weaken, and crack or give way. Scientists who study the history and structure of the earth say that bedrock cannot slip or give way. And strange to say, when the building is finished the rock will not be carrying a much greater load than it was before the earth was dug away. The weight of the earth and stone put there by nature and removed by snorting steam shovels is almost equal to the weight of the new building itself.

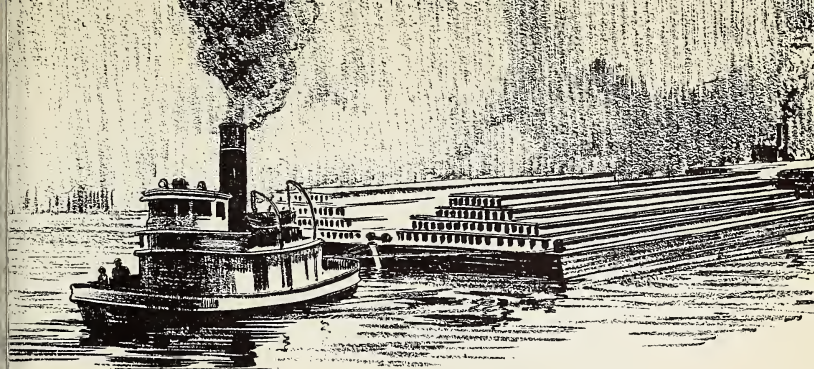
Before a single stone was loosened in the wrecking of the old Waldorf, the new Empire State Building had been completely built, entirely finished—but on paper. The architects and engineers knew how many tons of steel and aluminum, how many rivets and bolts, would be needed; how many blocks of limestone would be required and the shape and size of each one. They had drawings of almost every piece of material which would go into the construction of the building.

Orders went to the steel mills in Pittsburgh for the beams and columns. The size and length of every piece of steel was marked on the blueprints. In France and Germany men began to cut and polish marble blocks. Limestone was ordered from Indiana. Factories in New England started to produce hinges, locks, and all sorts of hardware. The size and weight and the exact day of future delivery for all materials were marked

on the orders. For a modern steel skyscraper is really put together on its foundations, much like the model which a boy puts together with the pieces of a toy construction set. The parts are made in the factories according to careful measurements so that they will fit exactly when they are brought together.

A steel building is truly a steel building. The stone work is only a covering put on the outside of it. The speed with which the beams and columns of the framework are put up sets the speed with which all the work can go





ahead. Putting up and riveting such an enormous amount of steel is a huge task in itself, but it is only a part of the building problem. Not much of the material can be stored on the job. It must arrive as it is needed. Men must not wait. Derricks must not swing idle.

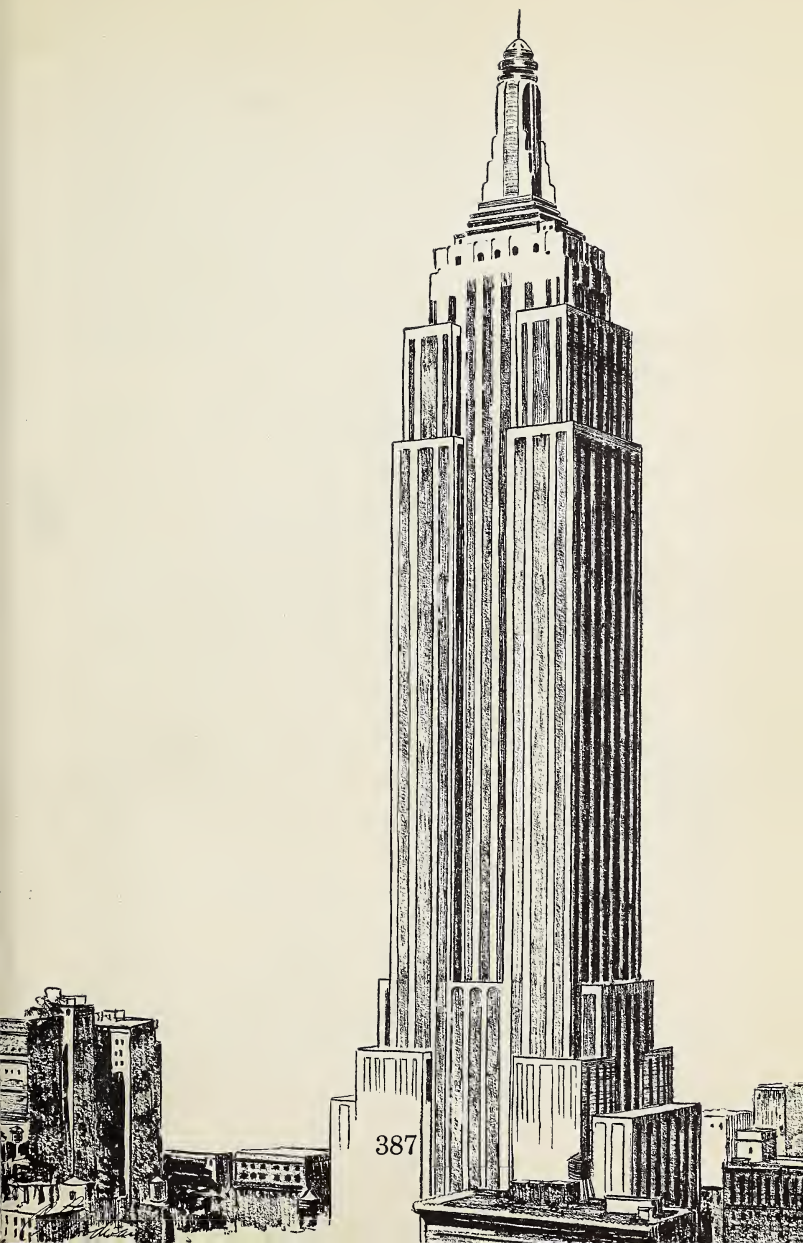
Enough steel was used for the frame of the Empire State Building to make a double railroad track from New York to Baltimore. This steel was sent from the shops as fast as it was manufactured and was stored in the railroad yards at Greenville, New Jersey. It still had to cross the Hudson River before arriving in New York; so it was placed on barges, towed across the water to a wharf, and trucked to the building on a careful time schedule. The moment of departure of each truck from the wharf, the length of time required for moving through traffic, and the exact moment of arrival were planned for in advance, for the construction of a building cannot be allowed to block traffic seriously. Beams arrived as they were needed and were put in place in the framework only eighty hours after they had been made in the steel mill.

The first section of steel column was put in place on April 7, 1930. Once the work was begun, the framework rose at the rate of four and a half stories each week. Early in May the hoisting derricks stood on the eighth floor. Twenty-five weeks after the first steel column was set, 57,000 tons of steel had been put in place. The framework of the building was complete to the eighty-fifth floor. The work was twelve days ahead of schedule.

As the frame climbed higher, a very small railway was built to carry supplies to all parts of each floor. This railway operated on a timetable published each morning, so that every minute of the day the men who ran the small trains of cars on each floor knew what was coming up on the elevators and which gang of workmen it should be delivered to.

The floors of a modern steel building are made of concrete. In the construction of the Empire State Building the making of these concrete floors followed closely behind the steel work. They served as a protection to the men working not far above and also to those men who were close behind, starting other kinds of work. As soon as the work of setting the stories had been well begun, wall construction moved along at the rate of a story a day.

Inside the partly enclosed structure, plumbers, steam fitters, electricians, and sheet-metal workers swarmed over the job, getting their network of pipes and wires into place. Every effort was put forth to get the building completely enclosed before the winter season set in.



When the framework has been enclosed by its four walls, a building may seem to the ordinary person to be almost finished. The builder, however, knows that this is not so. There are the inside walls to be put up; the doors and their frames to be set; ceilings and walls to be plastered; plumbing fixtures and radiators to be connected; elevators to be put in; electrical outlets, base plugs, and telephone outlets to be located in their proper places. Reading a list of only a part of these things would be very tiresome.

The Empire State Building has 6400 windows, nearly seven miles of elevator shafts, and 380 miles of electric-light and power wires, to which sockets for 350,000 electric lights are connected. Eleven hundred and seventy-two miles of rubber-covered wire cable were used to control the sixty passenger and six freight elevators. If all the materials used in the construction of the building were loaded into one freight train, the train would be fifty-seven miles long.

Slightly less than a year after the first steel column was erected, the Empire State Building was finished, complete to the mast on top for mooring a dirigible. There it stands, towering over the city, the tallest structure in the world.

Alfred Morgan

Classifying Information

1. When a skyscraper is constructed, a great many materials must be brought from many different places. The lesson mentions only a few of the kinds of materials used in the Empire State Building. Make a list

of them and write opposite each the place from which it was obtained.

2. The lesson describes the important steps in the construction of the Empire State Building. Reread the lesson carefully and list all the important steps that you can find. Then pick out the different workers and write their names below the step with which they helped. Here are the first step and the workers who helped with it:

Planning the new building

Engineers

Architects

Showing What Figures Mean

Pick out the figures that tell something about the size of the Empire State Building. Try to think of ways of showing more clearly what the figures mean. Here are two examples of how this might be done.

a. The Empire State Building is 1250 feet high. A one-story house of moderate size is about 20 feet high. If such houses could be piled one on top of the other, how many would it take to equal the height of the Empire State Building?

b. The Empire State Building has 6400 windows. Suppose a six-room house has 16 windows. How many such houses could be supplied with windows from the Empire State Building?

Try to write questions about the other number facts.

Topic Headings

I. USING TOPIC HEADINGS

The people who write your textbooks try in many ways to make them easier to study. One of these ways is the use of topic headings. A topic heading is the phrase or sentence in heavy type that tells what a short section of one or more paragraphs is about. Sometimes these phrases or sentences are written in the margin of the textbook. Sometimes they are real "headings"; that is, they are printed in a line across the page. Sometimes they are written as part of the first line of a paragraph.

Find the topic headings in your geography, your history, your science book, and in several reference books. Notice especially the different ways of arranging and printing them.

Topic headings serve two important purposes. First they tell you, before you start to read, the main idea of the next paragraph or paragraphs. This helps you to understand and organize the information that you find. Second, they help you to locate information very quickly.

The index tells you on what page to look for the answer to a question, but the topic heading tells you where to look on the page. The following list of topic headings is taken from a chapter on the Scandinavian countries in a geography textbook.

- a. The Fiord Coast of Norway*
- b. Farming in Sweden*
- c. Scandinavian Resources*

- d. Forests and Forest Work*
- e. Industries Depending on Forest Work*
- f. Norwegian Fisheries*
- g. Preparing Fish for Export*
- h. Sweden's Wealth of Iron Ore*
- i. Iron and Steel Manufacturing*
- j. Using Water Power Instead of Coal*

Suppose you wanted to find the answers to the twenty-one questions listed on pages 391-392. Number your paper from 1 to 21. After each number write the letter of the heading under which you would look *first* for information about each question.

Sometimes you may not find the information you want under the heading you select first, or perhaps you feel quite sure that other facts will be given under another heading. If you think more information about any of these questions might be found under a second topic heading, write the letter of that heading too, as your second choice. You should have some second choices.

1. Why do tourists like to visit the Norwegian fiords?
2. Do the Scandinavian countries have a large supply of coal?
3. What are the principal grains raised by Swedish farmers?
4. Is much fish exported from Norway?
5. What are the principal kinds of trees in the Scandinavian forests?
6. In what ways are fish prepared for export to foreign countries?

7. What minerals are found in the Scandinavian countries?

8. Are Swedish iron and steel of good quality?

9. For what purposes is water power used in Norway and Sweden?

10. What are the chief products of the Scandinavian forests?

11. How were the fiords formed?

12. What kinds of fish are caught by the Norwegian fishermen?

13. In what parts of Sweden is iron ore mined?

14. Why do the Scandinavian countries depend on water power for electricity?

15. How much iron and steel is manufactured in Sweden?

16. Besides farm land, what resources have the Scandinavian countries?

17. How much of Norway and Sweden is covered by forests?

18. Why is fishing such an important Norwegian industry?

19. How are Norwegian sardines prepared?

20. How important are the forest industries of Scandinavia?

21. What country is the best customer for Swedish steel?

If you finish the exercise before all your classmates are through, study the topic headings in one of your textbooks. Select a short section and make up questions that the section answers. Later your teacher will let you ask some boy or girl to pick out the topic heading under which each answer is found.

II. MAKING TOPIC HEADINGS

In the lesson "A Great Frenchman—Pasteur," you saw how easily the lesson might be divided into main parts called sectional headings. These parts, or sections, might be divided further into topic headings such as those in the geography text about which you have just read. For example, the sectional heading "Pasteur's Boyhood and Education" might have the following topic headings:

Pasteur's Boyhood and Education

Pasteur and his father

Pasteur at boarding school and college

Copy these headings on a sheet of paper, leaving a blank line after each of the topic headings. Turn back to the lesson on Pasteur and, on the blank line after each topic heading, write the numbers of the paragraphs that belong under it.

With what topic headings might you divide the section "Pasteur's Services to Industries"? Write your suggestions on a sheet of paper, using every other line. Then on the line below each of your topic headings write the numbers of the paragraphs that belong under it.

With what topic headings might you divide the section "Pasteur's Services to the Human Race"? Follow the directions given in the last paragraph for writing your suggestions for topic headings and the numbers of the paragraphs that belong under each one.

The Birds' Worst Enemy

I. AN ANCIENT ENEMY

In every civilized country thoughtful people are trying to protect birds. Almost every state in the United States has laws that prohibit the killing of certain kinds. Intelligent people are trying to protect birds not only because it makes us happy to have them near us but also because we have learned how much they help us.

But if we are to encourage and protect the birds, we must know what their enemies are. What do you think are some of the worst enemies of birds? You may think at once of one or two of the hawks that kill birds, of weasels, snakes, cats, dogs, men with guns, or even of boys with air rifles. Which of these enemies destroys the most birds? Does it surprise you to learn that the answer is cats?

Even those who love cats and keep them for pets admit that most cats kill birds. There is nothing strange about this habit of the cat. All the cat family—the tiger, the leopard, the mountain lion, the lynx, and the house cat—are hunters and meat eaters. Although the house cat has been domesticated for many hundreds of years, it has never lost its wild habit of hunting for its food. Even cats that are given plenty to eat by their owners still like to hunt. The earliest domestic cats that we know anything about killed birds, and the tamest pet cat of today will kill them.

The first domestic cats of which we have any records lived in Egypt, where they were known at least fifteen

hundred years before the birth of Christ. There are many old pictures of early Egyptian cats. Among these pictures is one that shows a cat catching birds. Others seem to show that cats were trained to catch birds for people to eat. One picture shows a cat catching a duck.

The Egyptians were forbidden by law to sell cats to the people of other nations or to allow anyone to take cats out of Egypt. In spite of these laws, however, cats were taken to other countries and soon were found in Greece and Italy, and later they spread into other parts of Europe. The earliest accounts of cats in ancient Greece and Italy show that these cats killed birds.

Many writers in France, Germany, and England in the early days mention the fact that cats kill birds. Cats were brought into England a little after the year 900. Somewhat later an English writer wrote a poem calling for vengeance on the whole race of cats because they had killed his pet bird. Notice the queer old spelling in the following lines of his poem:

That vengeance I aske and crye
By way of exclamacyon
On all the whole nacyon
Of cattes wild and tame
God send them sorrowe and shame
That cat especyally
That slew so cruelly
My lytell pretty sparrowe
That I brought up at Carowe.

In ancient Egypt, Greece, and Rome, and even in England at the time this poem was written, people had

not learned to study animal life as carefully as we do now. The examples just given merely show that the cat has long been known as one of the enemies of birds.

Dictionary Lesson

In the pages you have just read, you may have found a few statements that were hard for you to understand. Perhaps some of the words were new to you. The definitions of a number of words are given below. These definitions are given in the order in which the words occur in the lesson. For each of these words do four things: (1) learn how to pronounce the word, (2) find the sentence in which the word is used, (3) learn what the word means as it is used, and (4) explain the sentence in your own words.

do-mes'tic (dō-mēs'tik), *adj.* 1. Having to do with a household, family, or home; as, *domestic* life or duties. 2. Having to do with, or made in, one's own country; native; not foreign. 3. Of an animal, living with, or near, man; not wild; tame. 4. Remaining much at home; devoted to home.—*n.* A house servant.

do-mes'ti-cate (dō-mēs'tī-kāt), *v.* To make or become domestic.—**do-mes'ti-ca'tion**, *n.*

pro-hib'it (prō-hīb'it), *v.* 1. To stop or prevent. 2. To forbid by law or order.

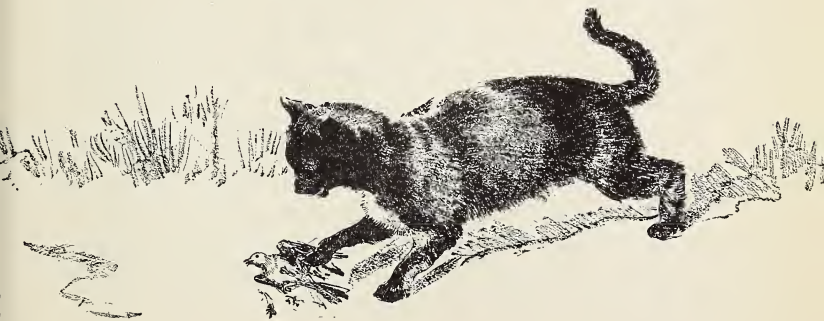
venge'ance (vēn'jāns), *n.* 1. Punishment in return for an injury or offense; the act of avenging; as, victims of the king's *vengeance*. 2. Revenge; as, to take *vengeance* on one's enemy. 3. Great force; a display of energy; as, to set to work with a *vengeance*.

The definitions above are taken from *Webster's Elementary School Dictionary — A Dictionary for Boys and Girls*, Copyright, 1935, G. & C. Merriam Company, Springfield, Mass.

II. HOW MANY BIRDS DO CATS DESTROY?

In recent years the cat has been studied very carefully, not only by scientists who are interested in learning about birds but also by those who are interested in learning about cats. The opinions of these scientists were collected by Edward Forbush, formerly State Ornithologist of Massachusetts and author of *The Domestic Cat*. An ornithologist is a person who studies about birds. Some of these opinions are given in this lesson. Read them and decide for yourself whether or not the cat is the birds' worst enemy.

Mr. Thornton W. Burgess, author of many books about animals and birds, states that, although the dearest pet he ever owned was a cat, he thinks that cats kill more birds than all other bird enemies together. He says that, one summer, weeks of watching and planning for photographs of birds at home were wasted because cats ate all the young birds in the nests of three pairs of robins, one of bluebirds, one of kingbirds, and one of chipping sparrows.



Mr. A. C. Dyke, the author of *Useful Birds and Their Protection*, watched one pet cat as carefully as possible for one season. This cat was known to kill fifty-eight birds during the season and it very likely killed many more.

John Burroughs, the well-known writer on wild life, said that cats probably destroy more birds than all other animals combined. He believed that if we are to keep birds we cannot keep cats.

Dr. Frank M. Chapman, of the American Museum of Natural History, author of important books on American birds, says:

"The most important problem in protecting birds is to find a way to dispose of the surplus cat population of this country. By surplus cat population we mean that very large number of cats which do not receive the care due an animal, and which, therefore, have to depend on their own efforts for food."

Dr. William T. Hornaday wrote a great deal about the protection of wild life. He said that in thickly settled communities the domestic cat is probably the greatest four-footed enemy of bird life. Thousands of persons who never have seen a cat hunt birds will doubt this statement, but there is plenty of proof that it is true. He thought that cats destroy several millions of valuable birds in the United States every year. He believed that in settled regions they are worse than weasels, foxes, skunks, and mink combined, because there are so many cats and they are not afraid to hunt in the daytime.

Edward Forbush said that any fertile island where there is plenty of fresh water and no cats is a bird paradise. There used to be many such islands along the coasts of the United States. But when cats are brought to an island, the number of birds decreases rapidly, and some kinds of birds disappear entirely.

Mrs. Mabel Osgood Wright, formerly president of the Connecticut Audubon Society and author of many books on birds, wrote that, if the people of the country insist upon keeping as many cats as they do now, all the good work that has been done to protect birds and all the loving care of individuals in watching and feeding them will not be able to save our native birds.

Ornithologists think that in many states more than 2,000,000 birds are killed by cats each year. One scientist believes that the cats in New York State kill 3,500,000 birds annually. You can see that the number of birds killed every year in the United States must be truly enormous.

To the conclusions reached by these scientists should be added those of the hundreds of other persons who have carefully watched their own cats. One woman reports that one mother cat killed every young robin in her orchard even when tar, wire, and other things were placed on the trunks of the trees to keep cats away. Another woman reported that, although she took the greatest pains to teach her cats not to kill birds, she did not succeed. One of her cats brought in three or four birds every day. One man reported that he counted 170 birds that his cat killed in ten years, and he believes that the cat killed many more.

It is clear that people who love birds, as well as those who love cats, must think what to do about this problem.

Finding Proof for Statements

It is important to know how to prove statements that you read, as well as statements that you make yourself. One way to prove a statement is to find what well-known authorities say about it. Several statements about cats are given below. Read each statement. Then turn back to the article and find what one or more authorities say about it.

Number your paper from 1 to 7. After each number, write the name of one or more authorities whose opinions prove the truth of the statement having the same number.

1. Cats kill more birds than all other bird enemies put together.

2. A single cat may kill more than 50 birds in one year.

3. If we keep as many cats as we do now, our efforts to protect and to feed the birds will not save the birds from being destroyed.

4. It is hard, if not impossible, to teach cats not to kill birds.

5. Cats kill large numbers of young birds.

6. In some states, cats kill more than 2,000,000 birds each year.

7. Because they are not afraid to hunt in the daytime, cats are an especially serious enemy of birds.

How to Keep Cats from Killing Birds

The lesson you have just read shows clearly that, if we can prevent cats from killing birds, we shall have more birds. Those who have studied the cat as an enemy of birds say that there are two things that must be done to solve this problem. First, we must do away with stray cats. To do this, all the people of the community must work together. Second, we must keep pet cats from killing birds. This is something that any boy or girl can do.

I. DOING AWAY WITH STRAY CATS

Almost every neighborhood has a number of stray cats that do not belong to anyone. Some of them have been carried far from home by their owners, who wanted to get rid of them. These cats must find their food as best they can. Almost all of them kill birds.

Most people agree that we should do away with stray cats. It is difficult, however, to tell a stray cat from a pet that has wandered far from its home. Many cats seem to like to roam around rather than to stay in the homes of their owners. Others are so poorly fed that they wander far from home in search of food.

Many people believe that owners should be required to buy for their cats licenses such as are required for dogs. This seems fair. There is no more reason for having licenses for dogs than for having them for cats. One city now has a law that every cat in the city must have a license. Another city does not require a license but makes each owner of a cat put a collar or tag on it with the owner's name on the tag. If licenses were

required, only people who cared enough for a cat to buy a license would keep one. The cats with licenses would be better fed and for that reason would be less likely to hunt birds. The licenses or tags would make it easier to tell them from stray cats. The stray cats could then be done away with in a manner that would cause them no suffering.

If you live in a town or city, you may wish to talk over with your parents some plan for licensing or tagging cats. Perhaps they can ask the men and women who make the laws for your city to require people to have licenses for their cats or at least to have each pet cat wear a tag.

II. KEEPING PET CATS FROM KILLING BIRDS

Everyone who has a pet cat should do something to keep his cat from killing birds. Boys and girls can help in this work as well as their parents. It does not seem possible to train most cats so that they will not catch birds. Other plans must therefore be used. Several such plans have been worked out by those who wish to keep a cat and yet wish to prevent it from killing birds.

The first of these plans is to feed the cat so well that it will not need to hunt for food. When a mother cat has kittens which are just beginning to eat meat, it is especially necessary to feed both the cat and the kittens. If this is not done, the mother will probably hunt food not only for herself but also for the kittens. A mother cat with half-grown kittens is especially

likely to hunt birds to feed to them. Even well-fed cats, however, will sometimes hunt birds.

A second plan is to fasten bells on each cat so that the bells will jingle whenever the cat moves. This helps to prevent the cat from catching some birds. Of course this plan does not protect helpless young birds that have fallen to the ground or that cannot fly away from the nest. In one nesting season a pet Angora wearing a collar with six bells brought thirty-two birds to the house, and it probably killed many more.

The third and best method is to keep cats away from the birds. Some people put a band around the trees where birds have nests and on posts which support bird houses so that the cats cannot climb to the nests. In winter the birds may be fed on platforms so high that the cat cannot reach them. There is no way, however, to protect birds which are on the ground or in bushes.

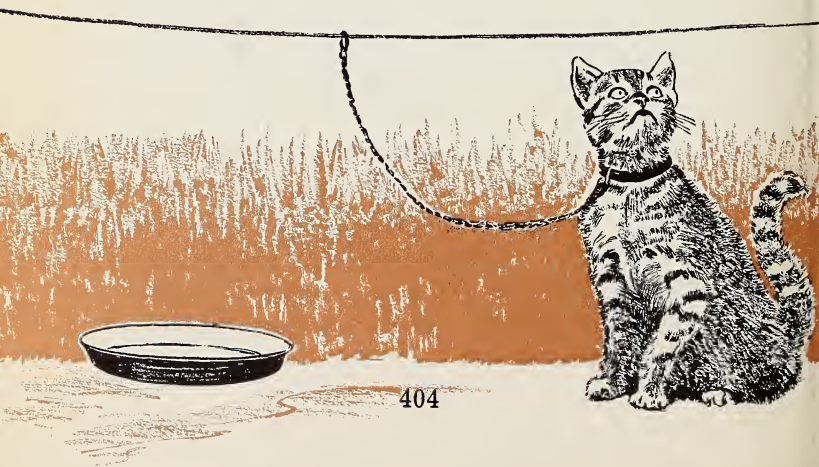
The surest way to keep a cat away from birds is to shut or tie it up at times when birds are likely to be caught. Cats should not be turned loose for the night, since they do their greatest damage in the early morning, when birds flock to the ground looking for insects and worms for their breakfast. It is quite common for a cat to kill a mother bird before she leaves her nest in the morning. If cats are turned out in the morning, it should not be until late and then only *after* they have been fed a hearty breakfast.

Many owners keep their cats shut up or tied during the birds' nesting season. Mr. Forbush told one way to tether, or tie up, cats:

"A cat may be tethered to an overhead wire in pleasant weather by means of a line and a snap hook. This gives outdoor conditions, allows the cat to exercise by moving back and forth, and probably will prevent it from catching birds, except possibly such young as flutter in its way. There should be a stop near each end of the wire so that the cat cannot climb and become entangled."

If you have a cat, remember that you must keep it from killing birds not only in your own yard but also in your neighbor's yard. You have no more right to allow your cat to kill birds in your neighbor's yard than your neighbor would have to keep a fierce dog which would come into your yard and kill your cat.

If you own a cat, it is a good thing to ask yourself the following questions:





1. Do I keep my cat at home so that it will not kill birds in my neighbor's yard?
2. Do I give my cat enough food so that it is not hungry?
3. Do I shut my cat up at night so that it will not kill birds in the early morning?
4. Do I keep my cat shut up or tethered during the nesting season?
5. Does my cat wear a collar and a tag?
6. When my mother cat has kittens, do I make sure that she has plenty of food for herself and the kittens?

Giving Reasons to Prove Your Answers

Each person who owns a cat should be able truthfully to answer *Yes* to each of the questions above. Read the first question. Be able to tell the reasons why the answer should be *Yes*. Do the same for each of the other questions.

Early American Methods of Travel and Transportation

Through many trials and many frights
I have returned, poor Sarah Knights,
Over great rocks and many stones
God has preserved from broken bones!

This verse was written to describe a journey on horseback from Boston to New York in 1704. Mrs. Sarah Knight, the Boston schoolmistress who wrote the verse, was one of the few women of her time who had the courage to travel overland between these two cities. She traveled with the postrider who carried the mail. They suffered great hardships and were many days covering a distance that takes but a few hours on one of our fast modern trains.

Today, when it is possible to travel with speed and comfort, we are likely to forget that there was a time in America when a journey of only fifty miles was a dangerous undertaking. Indeed, people who were going on a fifty-mile journey sometimes made their wills before starting and parted from their friends with tears and with prayers for a safe journey.

In order to understand the great changes that have taken place in methods of travel and transportation since these early days, we must go back to the ways of traveling used by the Indians who lived in the eastern part of North America when the first settlers came to make new homes there. The Indians' ways of traveling and transporting goods were so well suited to this country, of which the white men knew very little, that the American colonists immediately began to use some of these Indian methods.

The pages that follow tell many interesting things about how the Indians traveled and about what the colonists learned from the Indians about boats and trails. Read the lesson to find out as much as you can about these two questions:

1. How did the Indians of eastern America travel and transport goods?

2. What Indian ways of travel and transportation were used by the American colonists?

Travel was far more important among the Indians than transporting goods, for the Indians had few goods to move from place to place. They carried on trade in such articles as stone, copper, and pipestone over rather large stretches of country, but these things were passed on from hand to hand; there were no peddlers who traveled over a long route. To carry on this trade, to hunt and trap, to make war on enemies, and to move their homes, the Indians had developed two methods of transportation: first, by water; second, by land.

Indians living near lakes, rivers, or oceans traveled by water whenever it was possible. Most of eastern America, from the Atlantic Ocean to the Mississippi River, was covered with an almost unbroken forest—a forest of huge trees and thick undergrowth, very different from our open woods of today. To travel on land through a thick forest and over rough ground is very difficult. The best road through such a wilderness is a waterway, because it is smooth and is already clear of trees and undergrowth. And the vehicle for such a road is a boat of some sort.





The waterways of eastern America offered the Indians an excellent system of roads through the wilderness, because there were so many of them; lakes and rivers were everywhere. The boats in which the Indians traveled could be used in very shallow water. Many of them were so light that it was easy to make a portage; that is, to carry the boat overland from one stream to another or around rapids. The country was so thoroughly cut up by streams, lakes, and other bodies of water deep enough for such boats that long journeys could be made with only a very few portages. Most of the transportation among the Indians of the eastern woodlands was water transportation.

The Indians used two very different kinds of canoes. One was made from a log of suitable size, and the other from the bark of a tree, especially the birch tree. To make a canoe from a log, the Indian chose a section of trunk from fifteen to thirty feet long and three feet thick, which he hollowed out by fire and with a stone ax, or adz. This kind of canoe was called a dugout. The dugout was strong and useful, but heavy and slow moving. It could not be carried overland from one body of water to another.

To make a birch-bark canoe, the Indian selected a birch tree, made a straight, vertical cut in the bark from near the bottom of the trunk to a spot at the height of his head, and then with great care peeled the bark from the tree by the aid of his knife. These strips of bark were sewed together with the long, tough, slender, threadlike roots of larch or balsam trees. This bark covering was skillfully cut and shaped

to the necessary pattern, and fastened with the same threadlike roots to a framework of light spruce wood. Hot pitch from the spruce or the balsam tree was then spread on all seams and cracks to make the canoe watertight. Each tribe had its own pattern or style for its birch-bark canoes, some of which were very beautiful. In this graceful boat, which rode the water as lightly as a cork, and which he could carry easily upon his head, the Indian braved all kinds of waters, shooting the rapids of swiftly flowing rivers and riding the waves of the Great Lakes. He handled his canoe so skillfully that it glided smoothly through the water; but the white man often got a ducking in his first attempts to use a bark canoe.

Which of these two kinds of canoes was used depended upon the following things: first, upon the kind of water in which the canoe was to be used; second, upon the number of portages to be made; third, upon the supply of birch trees; and fourth, upon how fast the traveler wished to go. In the Great Lakes region, in New England, and in Canada, where there were many birch trees and where rapids and portages made a light craft desirable, the bark canoe was most used. In the South, especially in the region of the Gulf of Mexico, where there were no birch trees and where fewer portages were necessary, the dugout was used.

The American colonists used both the bark canoe and the dugout, but the white men had so many unfortunate experiences in trying to balance the bark canoe that the dugout came to be more generally used. As the population increased, so great was the demand

for logs suitable for canoe-making that in the Massachusetts Bay and Plymouth colonies such logs were marked by the authorities, and their use for any other purpose was forbidden.

For their land travel the Indians made paths, called trails. These trails followed the shortest practical routes. Many of them were first made by deer or buffalo as they went from one feeding ground to another or as they searched for water or for salt licks. The Indian trails led to the best crossing places over streams, they led through the lower passes in the mountains, and they kept away from marshes and steep slopes. In fact, these routes were the natural highways of the country. Whenever possible, the trails clung to high ground, following the tops of hills, from which the water was most quickly drained, where there was least underbrush, and where there were few streams to be crossed. On the high ground, too, the wind swept away the snow in winter.

Before the white man came, the most important trails led to the country of enemies and to hunting grounds. After the white man came, the trails most used led to the nearest trading posts and to the forts of the white man.

An Indian trail was only a narrow path from twelve to eighteen inches wide, for the Indians always traveled in single file. It often lay a foot or two below the level of the surrounding ground, beaten down by the many feet that had passed over it. The Indian did little or nothing to improve the bed of his trail. Trees and bushes grew close on each side, and it was generally



impossible to see ahead more than a rod or two. After a rain the water from the branches often drenched the travelers to the skin, while a single windstorm could easily fill the narrow trail with leaves and branches so that it was almost impossible to use it. If storms or floods did make it impossible to follow a trail, the Indian did not try to clear it, but merely made a new one.

Streams were either forded or crossed on fallen logs. The fords were usually at the point where one stream flowed into another, for here bars of sand or of mud were always to be found. Indians built no bridges, for the need of these came with wheeled vehicles, which were unknown to the Indian. In fact, the Indian had practically no land vehicles at all and no strong beasts of burden. Dogs were sometimes used to draw a rude sled for short distances, but almost all the burdens were carried on the backs of the Indians, and were partly held in place and steadied by a strap that passed over the forehead, called a burden strap. After the white man introduced horses from the Old World, the Indians used them as pack animals.

The early American colonists found the country crossed by many narrow trails. Since these trails were the natural highways of the country and so offered the best routes inland, the settlers followed them on their hunting and exploring trips. In time these narrow trails became widened into roads. As the settlers went farther and farther inland, the Indian trails westward became pioneer roads to the West, for each of these westward trails led to some river or lake of the Missis-

issippi Valley and the Great Lakes region. Later these routes developed into the great highways of the country. Today the routes of all the main Indian trails are occupied by important railway lines; in fact, almost the whole present-day system of transportation in America, east of the Mississippi River, follows these natural highways made by the Indians years ago.

Testing Your Memory of Main Points

Recall the important points about each of the questions given at the beginning of the lesson. Then look back at the lesson to see if you have forgotten any points. When you are ready, close your book and wait for the signal to begin the tests.

A

Write the answers to the questions on the next page. Do not look back at the selection as you work. Number your answers as the questions in the book are numbered. Use as few words as possible. Some questions can be answered in one or two words. The answer to the first question shows you one way to write an answer in a few words when it has more than one part.

1. *For what four purposes did the Indians need to travel?*

Notice this short way of writing the answer:

1. a. *To trade*
- b. *To hunt and trap*
- c. *To make war on enemies*
- d. *To move their homes*

If you come to a question you cannot answer, skip it and go on. Go back to it later.

You will have an opportunity to check the accuracy of your work by comparing it with that done by your classmates.

2. What were the two chief methods of transportation used by the Indians?

3. Which method did the Indians prefer to use?

4. How did the Indians usually carry goods on land?

5. What Indian boats were used by the American colonists?

6. Why did Indian trails become pioneer roads to the West?

B

Copy the form below on your paper just as it is here, and fill it in with the answers to the questions given below it. *Do not write in this book.*

<i>Canoe</i>	<i>Materials</i>	<i>Where Used</i>
<i>a.</i>	<i>a.</i>	<i>a.</i>
<i>b.</i>	<i>b.</i>	<i>b.</i>

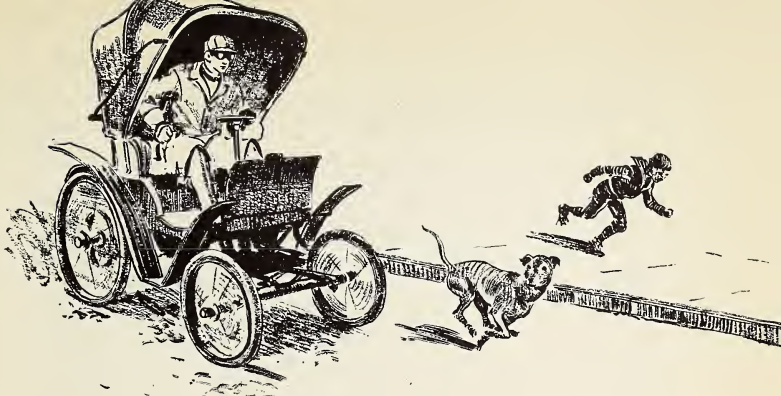
What two kinds of canoes were used by the Indians?

Of what materials was each canoe made?

In what part of the country was each most used?

C

When you have finished Test A and Test B skim through the lesson and find sentences to read in class to prove your answers.



The Early Days of the Automobile

In almost any American city about 1895, you might have found the streets lined with people who had come to see an automobile for the first time. The queer-looking vehicle, sitting high above the street on its tall wheels, chugged slowly along. As often as not it quit chugging and stopped, while its driver and his helpers got out to tinker with the engine or to push the car along.

When a car stopped, the crowd usually thought it was very funny, and such shouts could be heard as "Get a horse!" or "So that's an automobile; it orter be mules!" or "Pushamobile is a better name for that thing!" To the people who were watching, the whole performance was a huge joke. Any man who owned one of the strange new horseless vehicles was thought to be a little queer.

Clumsy as they were, however, these cars were the result of many, many years of experiments that attempted to develop a horseless carriage.

I. EARLY MOTOR VEHICLES IN EUROPE

The first attempts to develop motor vehicles were made in Europe. The earliest of these vehicles were built to be driven by steam engines. About 1770, when much of North America was still unexplored and unsettled, a Frenchman drove a steam vehicle along the roads in France, astonishing the people and frightening the animals. But it was pretty much of a failure. It could travel only three miles an hour, and it had to stop every few yards to get up steam. The noisy engine soon shook itself apart.

When the railroad locomotive became a success, it was natural that men should attempt to use steam engines in carriages to run on the streets and roads. Inventors in England worked especially hard on this problem, and they succeeded rather well. Borrowing the name from the railroad engines, these steam carriages were called locomotives. However, the public objected so much to these vehicles that in 1865 the English Parliament passed a law that greatly limited their use.

Among the most important parts of the law were the following:

"... at least three persons shall be employed to drive or conduct such locomotive.

"... one of such persons, while any locomotive is in motion, shall precede such locomotive on foot by not less than sixty yards, and shall carry a red flag constantly displayed, and shall warn the riders and drivers of horses of the approach of such locomotive, and shall

signal the driver thereof when it shall be necessary to stop, and shall assist horses, and carriages drawn by horses, passing the same.

"... it shall not be lawful to drive any such locomotive along any turnpike road or public highway at a greater speed than *four miles an hour*, or through any city, town, or village at a greater speed than *two miles an hour*."

The law also stated that the name and address of the owner had to be painted on the locomotive, that it could not whistle or blow off steam, and that any person in a horse-drawn carriage could make a locomotive stop by putting up his hand.

This law delayed the development of motor vehicles in England for thirty years. During this time, however, progress was made in other countries, especially in France. French cars were largely made to order; but since it was difficult to get repairs made, the cars were out of use much of the time. Even so, it is estimated that there were about two hundred cars in use in Paris in 1895.

In 1895 a magazine article was published describing an early automobile seen traveling about Paris. The article states that:

"... it is no uncommon thing to meet on a summer day a little open vehicle flitting along without apparent means of motion, upon rubber-shod wheels, or panting forth a gentle warning from a square-shaped box in front. Two, and sometimes three, persons are seated in it, one of whom drives by means of a handle. To

stop or to start again requires the turn of a screw or the push of a pedal. Such, in its most accomplished form, is the *Automobile*.

"To see it pass at racing speed—some of these little machines can spurt at twenty miles an hour—takes one's breath away at first."

II. EARLY AUTOMOBILES IN AMERICA

Little was done toward the development of the automobile in America before 1895. Until that time an automobile was thought of as something queer and interesting that few people dreamed of owning. Automobiles were considered the playthings of rich men. Almost no one imagined that they would come into common use so quickly as they have. In every community there are men and women who can remember the appearance of the first automobile there, and the excitement that its coming caused among the people.

In 1903, *The Lake View Herald*, a newspaper in Oregon, printed the following description of what happened when the first automobile came to a small town:

"The first automobile to visit Lake County arrived here Thursday afternoon, having spent six hours from Alturas to this place, a distance of sixty miles. The wonderful machine would have made much better time had it not been for the accidental breaking of one of the main springs over the front axle. An automobile is a novelty, and the town had a gala appearance, the streets thronged with crowds of eager people, many of whom waited long and patiently."

In the United States, as in England, many people at first objected to motor vehicles, and New York passed a law similar to that which was passed in England. Although it was never enforced, it forbade any person to drive or lead "along a public highway a wild and dangerous animal or a vehicle or engine propelled by steam, except upon a railroad, . . . unless a person of mature age shall precede such animal, vehicle, or engine by at least one-eighth mile, carrying a light if in the nighttime, or a red flag if in the daytime, and give warning to all persons whom he meets traveling along such highway."

With the introduction of the useful and convenient streetcar in American cities, people objected less and less to motor vehicles. American inventors were encouraged to develop motor cars.

Not all early automobiles in America were built with gasoline engines. Some were steam cars in which various fuels, such as petroleum, gasoline, kerosene, and alcohol, were used to produce steam.

At first, electric cars, sometimes called electrobats or electromobiles, were popular. They ran more smoothly and more quietly, and were much cleaner than gasoline wagons or steam carriages. However, electric cars were run by batteries that had to be recharged about every twenty-five miles. Unless the batteries could be exchanged, the car could not run for two or three hours while the recharging was done. Therefore, electric cars could not be used satisfactorily except in cities where there were plants to recharge batteries. By 1900, however, the gasoline motor was

considered the best for automobiles for general use both in the city and in the country.

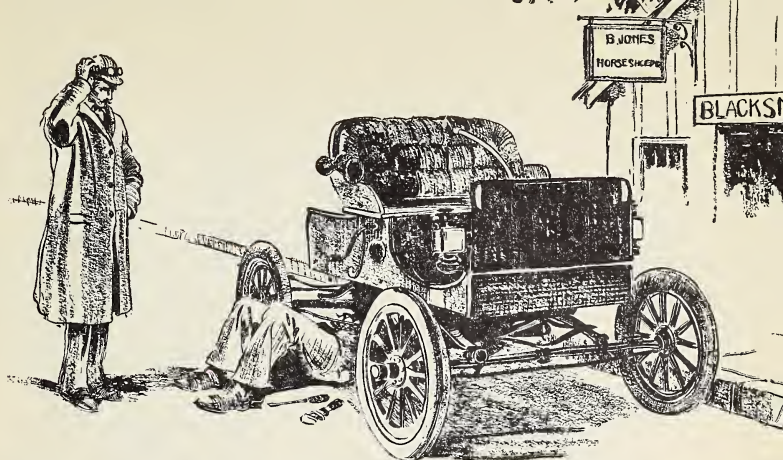
From the beginning, American automobiles were distinctly American. They were not copies of the older European cars. American cars were easier to drive and were cheaper in price than those of Europe. Even so, the average cost of an American-made car in 1906 was between two and three thousand dollars.

Owning and driving a car before 1900 was very different from owning and driving a car today. The automobiles of that time were very hard to start. With the best luck, it took the driver from three to five minutes to start the motor. Some cars were started by lighting a match to explode the gas in the motor. Others were started by heating the motor with a lamp. One early American car used even gunpowder to start the engine.

Before motor cars became widely owned, drivers tried to be careful to keep them from breaking down. There were no garages, and every man had to make his own repairs with such aid as he could get from the local blacksmith. If a broken part could not be repaired, a new one had to be ordered from the factory. Usually this meant a long delay.

III. EARLY AUTOMOBILE RACES

A good deal of information about early automobiles can be found in accounts of the first automobile races. These races were not run on race tracks but took place either in city streets or on roads between cities.



The very first automobile race ever held was run in France in the summer of 1894. The distance was 79 miles. The greatest speed that any car made during the race was 18 miles per hour. Even at such a speed, one man had to lean out to balance the car in rounding curves. Of the nineteen cars entered in the race, seventeen reached the finish line, but not without much excitement along the way. Seven dogs were run over, one bicycle-rider was injured, and the boiler of one steam car burst. In the following year another race was run in France over a distance of 744 miles. The winners completed the trip in about 60 hours, averaging $12\frac{2}{5}$ miles per hour.

The first race in America was held in Chicago on Thanksgiving Day, 1895. It was run over a 92-mile route through the city streets. Many of the streets were unpaved, and the motorcycles, as automobiles

were called in that race, chugged along the route with difficulty. One by one the cars dropped out of the race, unable to travel through the snow and mud. Every car except one had to be towed or pushed back. The winning car took more than ten hours to complete the race.

In the following year a "Horseless Carriage Contest" was held in New York. Three thousand dollars in prizes was offered the winners. It was considered an important event, and the judges were all famous men. Nine cars entered the race. Like the Chicago race held the year before, this one was run over a route through the city streets. People objected so greatly to horseless carriages, however, that the city officials refused permission for them to pass through New York's Central Park.

Reports of the race announced with amazement that one car ran one lap of the race, a distance of $16\frac{1}{2}$ miles, in one hour and five minutes. A magazine article at that time said: "This car climbed the steepest hills without assistance or delay; and the turn was made up a stiff grade with perfect ease."

The records made in recent races show how great the improvement in automobiles has been since the early days. Even as early as 1903, Barney Oldfield drove his automobile more than a mile a minute. In 1937 an Englishman named Eyston drove his car, *Speed of the Winds*, 2000 miles at an average rate of more than 160 miles an hour over the salt flats near Salt Lake City. In 1938, in another racing car, *Thunderbolt*, he traveled the fastest that man had ever gone



on land, setting a record of 357 miles an hour. As cars are improved, this record, too, will be broken.

But racing cars, wonderful as they are, are not so important in the automobile industry as are the cars

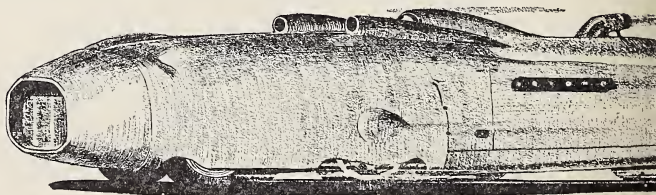
made for ordinary use. Their great speed is of interest not because persons need to drive so fast but because such speed shows how much the machinery of automobiles has been improved. Because of these racing tests and other experiments, even the low-priced car of today wears longer and is faster, safer, and more comfortable than the most expensive car that factories were able to turn out in 1900.

Finding Facts for Comparison

These are some of the ways in which you can compare the early automobiles with those of today:

Speed	Ease of repairing
Popularity	Fuel
Ease of driving	Laws about cars
Method of supplying power	Cost
Method of starting	Safety

For each of the topics above, find at least one sentence which states a fact about early automobiles. Then, for each topic, tell what you know about modern cars.

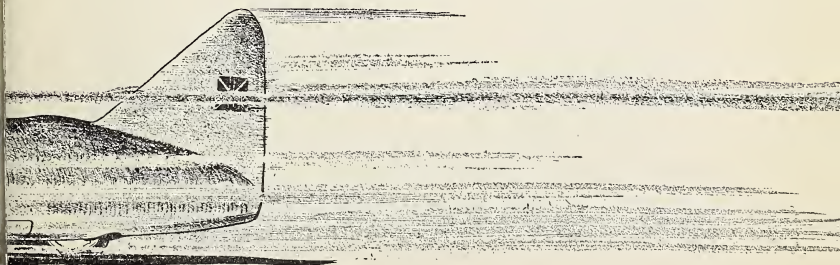


Reading and Comparing Records

You have seen in the article on early automobiles that from year to year cars were built to run faster and faster. Arrange the speed records below in order from slowest to fastest. Some records are stated in number of miles per hour. Some are given in other ways, as 744 miles in 60 hours. To do this exercise, first change each speed record to the number of *miles per hour*. For example, 744 miles in about 60 hours equals $12\frac{2}{3}$ miles per hour. ($744 \div 60 = 12\frac{2}{3}$)

- 3 miles in an hour
- 744 miles in about 60 hours
- 20 miles in an hour
- 6 hours for 60 miles
- more than 160 miles an hour
- 10 hours for 92 miles
- a mile a minute
- more than 357 miles an hour

Skim through the article to find the account of each speed record. In what country was each made?



Twenty-Four Hours with the Coast Guard

If you live along the seacoast or if you have read a great deal about ships and the sea, the words in this lesson will not give you much trouble. But if you live far from the ocean and do not know many special words about ships and the sea, you will need to use your dictionary as you read. Do you know, for example, what *surf* is? Studying the pictures will help you to understand the meaning of some of the new words used in this lesson.

The story goes that many years ago a grizzled old keeper of one of the lifesaving stations near Cape Hatteras was setting out in his small surfboat to go to the rescue of a ship pounding to pieces on a rocky ledge some distance from the shore. Someone watching him, and alarmed by the fury of the storm and the raging of the waves, exclaimed, "Why, Cap, you're not going out in a sea like that, are you?"

"Yes, I certainly am," replied the fearless old lifesaver.

"Well, you don't expect to come back, do you?" his questioner went on.

"I don't know anything about coming back," was the man's simple reply. "All I know is, the regulations book says you have to go out; it doesn't say anything about coming back."

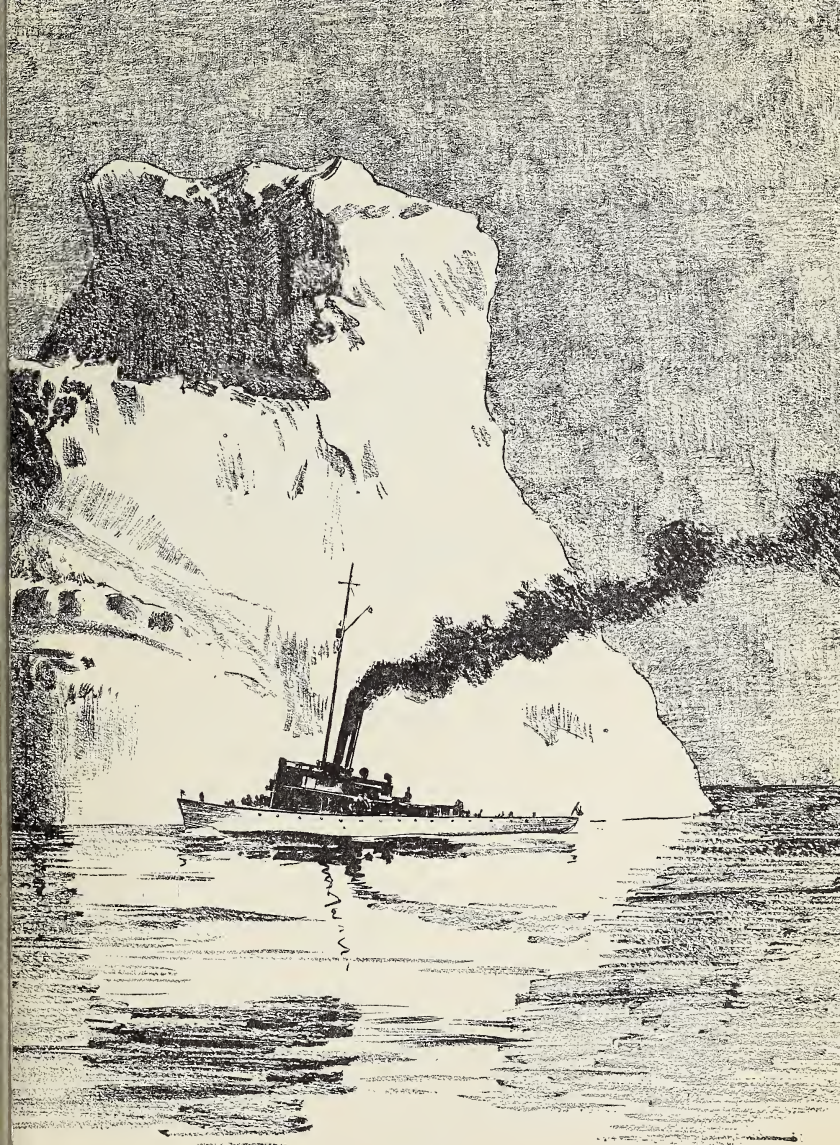
The present United States Coast Guard has developed from the old Revenue Cutter and Lifesaving Services. The passing years have added many new

duties and many more burdens of responsibility to a service which has been well called the "Navy of Mercy." The Coast Guard's main duties are to save life and to uphold our laws of the sea. Many Americans seem to know very little of the Coast Guard's duties. If they think of the Coast Guard at all, it is as a life-saving service along the shore. In order to get a fairly complete idea of the Coast Guard's widely scattered duties, let us take a bird's-eye view of the service on some one day, let us say in the month of April. Within the same twenty-four hours we shall find the various units of the Coast Guard engaged in the following work. How many kinds of service are there?

A thousand miles east of New York, on the foggy, gloomy Grand Banks of Newfoundland, a lonely little cutter is watching a giant iceberg which is drifting toward the routes of ships crossing the Atlantic Ocean, where it will endanger ships and lives. Officers, whose duty it is to watch the ice, study the position and probable drift of every iceberg sighted or reported by radio, and four times a day Coast Guard radiomen will broadcast a long warning message for the benefit of the ship-owners of all nations. Sailors merely mark their charts to show how far south the ice will go and choose their routes so as to keep away from it. In all the years that the Coast Guard has provided this service for the International Ice Patrol, not a single life has been lost because of a vessel's striking an iceberg.

A small, fast observation plane is flying low over the Everglades of southern Florida. Suddenly the pilot swings off in a different direction and slows down as

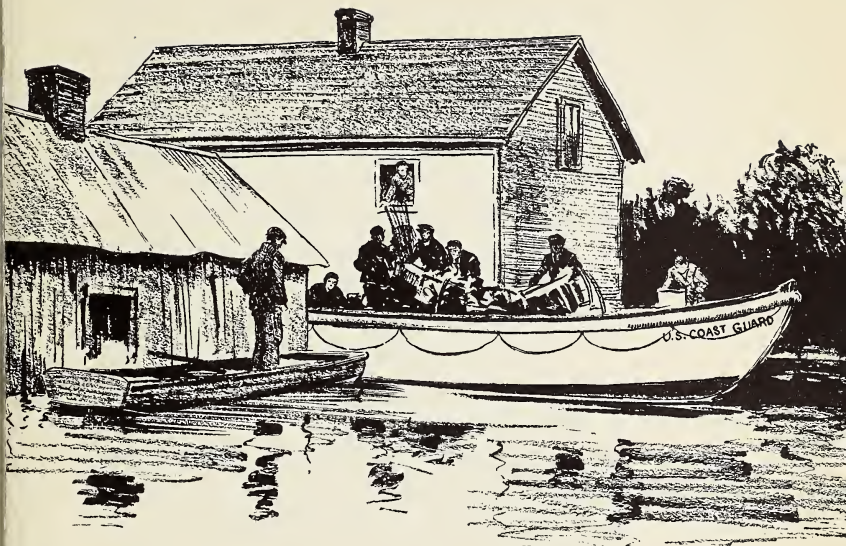




he circles over a suspicious-looking spot. Motioning to his co-pilot, he points out the place, which may be possibly a "black landing field" used by planes that smuggle goods into the country. In short, quick sentences he dictates a brief message to his radio operator, giving the exact location. The operator taps off the message to the home station near Miami, and in a few minutes the information is sent to the government office that deals with such matters.

Up on Lake Superior an early-season vessel has come to grief on a rocky island during a terrific gale and an inky-black night. With their ship rapidly pounding to pieces, far from any house or town and with no radio, things look dark for the shipwrecked crew. They burn the usual distress flares and fire several rockets without much hope of attracting attention. Suddenly a red flare blazes through the darkness. A beach patrolman of the Coast Guard has seen their distress signals and is already hurrying back to his station to give the alarm. A sturdy lifeboat slides down into the water, and within a few hours the entire crew will be removed from the wreck and brought to the warmth and safety of the Coast Guard station.

Heavy rains have swollen the Ohio River. Farms are flooded, and horses and cattle are being swept away in the swirling brown waters. Many flood victims are trapped on rooftops. Food and medical supplies are running low. It is a thousand miles from the ocean, but the Coast Guard is on the job. There is a Coast Guard station at the Falls of the Ohio, and from other places Coast Guardsmen and boats are rushed for



flood-relief work. When our inland rivers rise over their banks, Coast Guardsmen can be found rescuing flood victims or carrying important supplies. A Coast Guard plane or two will be found on guard, warning communities of the height of the flood, or dropping down to rescue people who are in danger.

Far out in the Pacific a small white cutter rolls idly in the waves of that great ocean. This cutter has an appointment, one of the strangest in the world. She is not waiting for another ship; nor is it her duty to save human life. She is waiting for seals, and when the first herds appear from their winter's wandering in southern waters, cutter after cutter will "ride herd."

To "ride herd" means to keep a day-and-night guard over these sea creatures until they reach their summer home in the islands near Alaska, far to the north. Before the meeting of countries at which laws to protect the seals were finally agreed upon, these animals were being killed in such large numbers that it seemed that none might be left. Today the seals are guarded by the government of the United States. Woe to the seal-hunter who thinks he can slip by the watchful fleet of Uncle Sam's Seal Patrol!

Another lonely cutter, specially built for such work, is slowly forcing her way through pack ice in the far-away Arctic Ocean. The *Northland* is on her annual trip to Point Barrow, the northernmost point of Alaska, where Will Rogers and Wiley Post met death. The *Northland* carries the United States mails and government supplies to teachers, missionaries, and government workers in lonely out-of-the-way places. Her captain has been given the power by the United States to arrest criminals, hold court, perform marriages, or carry out any other necessary duty of his office. The ship's doctor and dentist will care for suffering natives and whites.

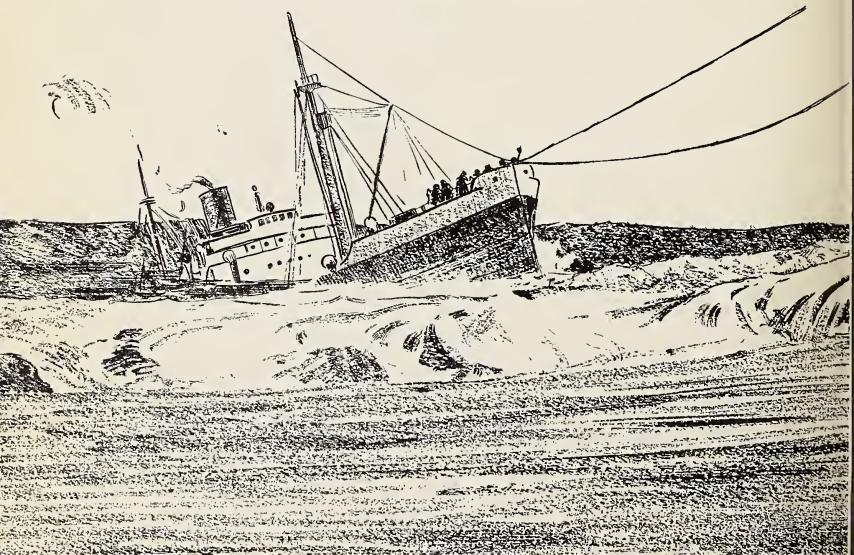
On the North Atlantic an engineer on a tanker, several hundred miles from the Virginia Capes, has been badly burned in an accident. With no doctor aboard, and the ship at least two days' journey from the nearest port, his hope for life is very slim. But the tanker carries a radio, and its operator sends word to the nearest Coast Guard stations. The "medico" message is sent on to Cape May Aviation Base, and a big

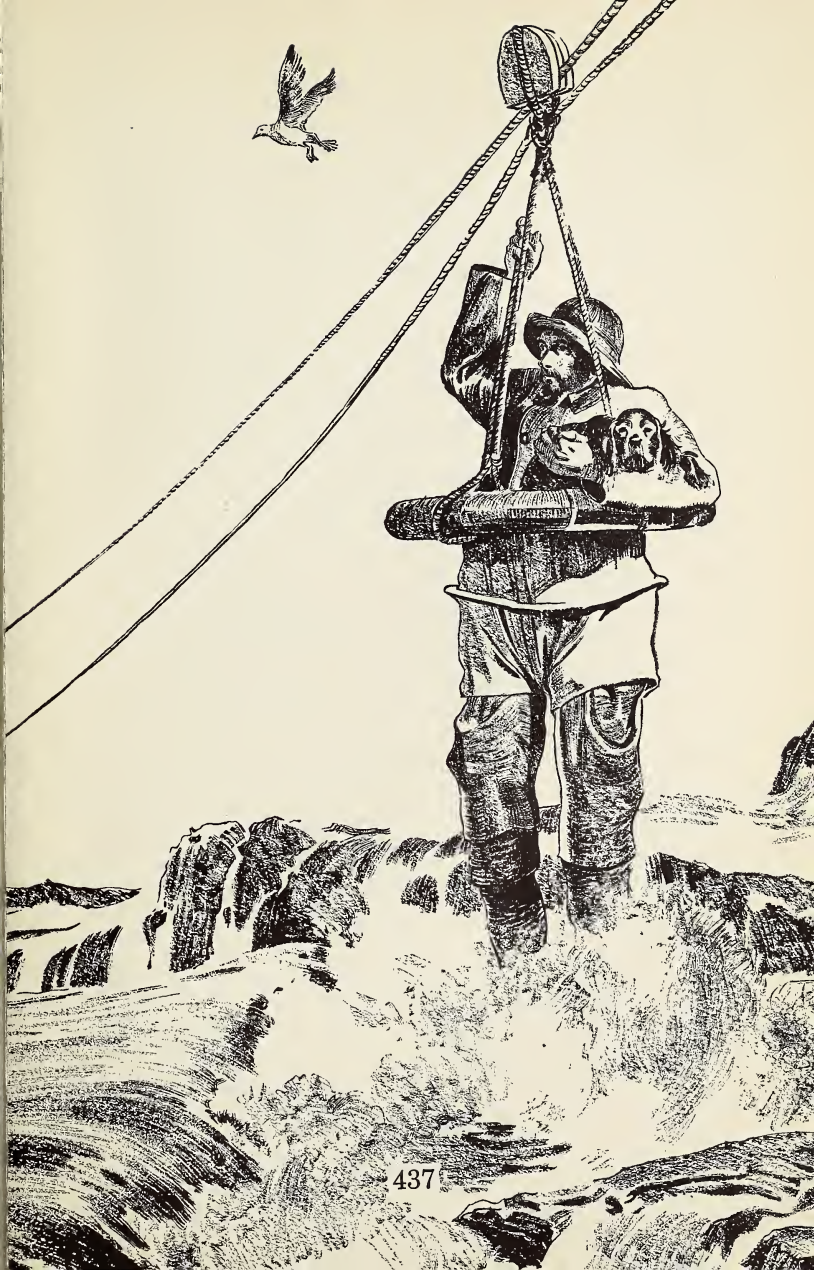
flying ambulance is warmed up. It takes off at once with a crew of five: pilot, co-pilot, radio operator, mechanic, and a special mate to care for the injured man. The pilot flies straight toward the tanker without hesitating or searching, aided by directions furnished by the radio operator on the ship. The injured man is picked up, and the ambulance plane roars back to its station, as the special mate gives first-aid treatment to the sufferer. Within a few hours after the accident the seaman is in a hospital, his life saved by the radio and the flying ambulance service of the United States Coast Guard.

A private plane, carrying no radio, is flying from New York to Florida, and its pilot is following the coast line. He knows about the service of the Coast Guard that keeps a record of the passing planes, so he "checks in" by flying low over each Coast Guard station as he goes on down the coast. He is "checked in" at Kitty Hawk station, North Carolina, at 1.00 P.M., flying low and having engine trouble. The lookout man telephones his next neighbor to the southward, giving the plane's number and description. But neither that station nor any other in the chain stretching down to Cape Hatteras sees or hears the plane during the next hour. The plane must have been forced down south of Kitty Hawk; patrolmen set out to find it. It is soon found, wrecked in a lonely spot. The pilot has a broken leg. The surfmen take care of the injured leg and carry the aviator to the nearest station. One man is left to guard the plane until its owner can send for it.

Down on the Gulf of Mexico another Coast Guard vessel is "on the job." A dangerous piece of wreckage is reported sixty miles west of the Dry Tortugas (tôr tōō'gáz), right in the path of the vessels bound to and from the Straits of Florida. A patrol boat is sent out from Key West to destroy it. After a day's search the wreck is found just before dark. Huge waves and darkness make it impossible to board the wreck; so the patrol boat stands by all night, keeping its searchlight trained on the spot. The weather has improved by morning, and mining experts set to work to blow the watersoaked old ship into bits. Shippers are told that the wreck has been destroyed, and captains follow their routes with a greater feeling of safety.

During the night a foreign freighter is driven ashore in a storm off the coast of Massachusetts. A beach





patrolman discovers the wreck almost as soon as the vessel is aground. He notifies his station, and surfmen are quickly on the way, a tractor dragging their beach cart with equipment through the deep, shifting sand. A special kind of gun fires a light-weight line over the wreck. With this the seamen on the boat haul aboard the heavy rope which they fasten to the mast of their vessel. The old ship is grinding badly and cannot be expected to hold together long. But before they have much time to worry about their position, the sailors see a huge pair of canvas pants, the breeches buoy, coming out along the heavy rope. A sailor steps into these queer pants, a signal is made to the surfmen ashore to pull in, and the first of the rescued men is on his way to land, high above the raging waves. In a short space of time the last man is landed on the beach, unharmed except for a soaking from flying spray.

From the Grand Banks to Alaska and from the Gulf of Mexico to Lake Superior, the United States Coast Guard carries on its work on land and sea and in the air. The service is not well known to many citizens, especially those living inland, partly because most of its rescues and work are done far from centers of population and partly because the Coast Guard looks upon its work merely as a job and a duty to be performed without benefit of public praise. True to its motto, *Semper paratus*, the Coast Guard is *Always ready*—ready to “go out” without weighing the chances of coming back.

Karl Baarslag

Making Summary Statements

How many services of the Coast Guard are described in this lesson? Check the number with your classmates so that you all agree on the correct number. Then make a summary statement about each service. Be sure your statement is brief and clear and tells the main idea.

Explaining the Meaning of Words

The following list contains several words and phrases that were used in describing the work of the Coast Guard. Explain what each one means.

vessel that is aground	a slim hope
tanker	ship pounding to pieces
patrol boat	boat that stands by
flying ambulance	distress flares
cutter	beach patrolman
inland rivers	a swollen river

You will get most help by rereading the sentences in which each word or phrase is used. If, after studying the sentence, you still do not understand a word, use your dictionary. Be sure to select the meaning that fits the sentence.

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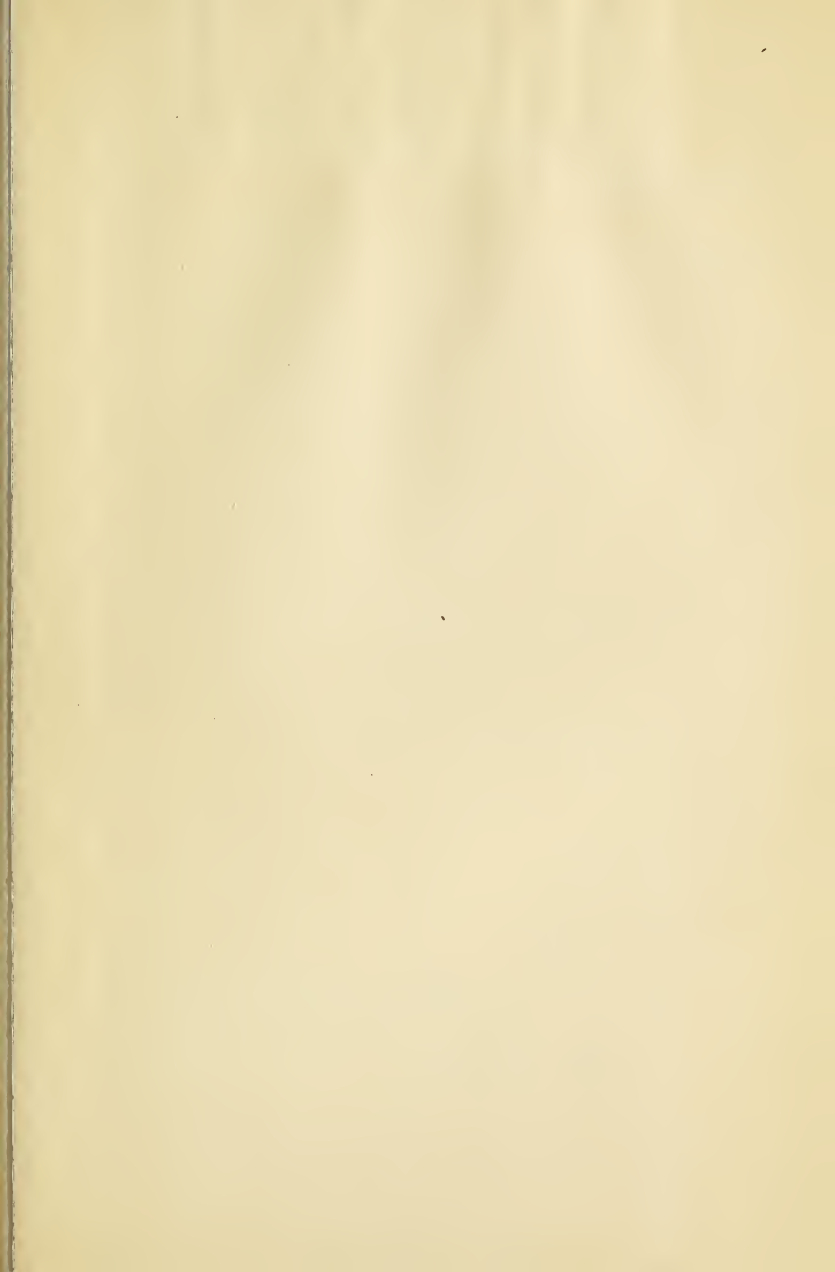
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